MAY 24, 1954

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

entry for its log . . .

1852
San Francisco Gas Co, original predecessor of PG&E, is formed

1903
California Gas & Electric Corp established

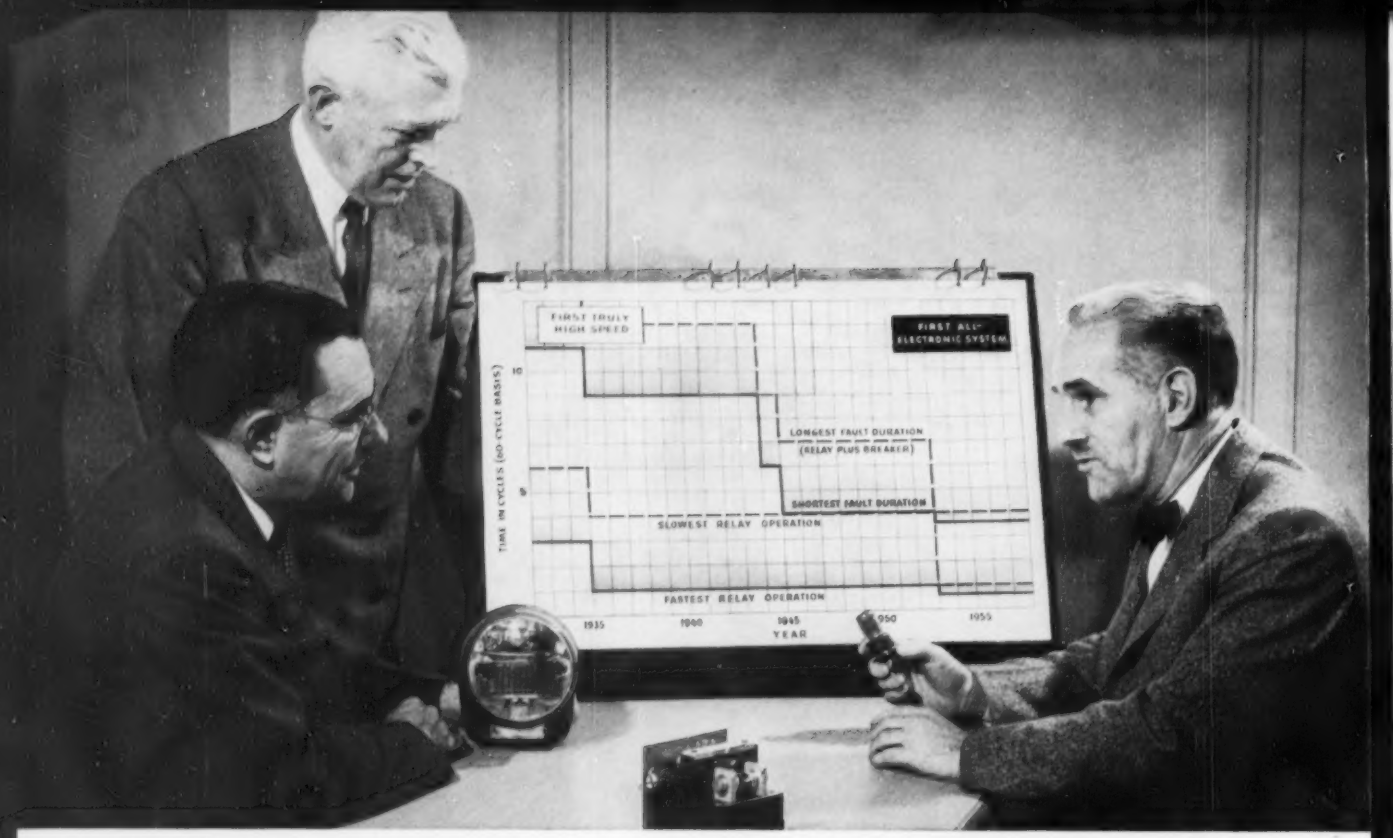
1905
PG&E incorporated with merger of San Francisco Gas & Electric and California G&E

1912
PG&E starts first hydro projects on Bear and South Yuba Rivers

1930
PG&E acquires San Joaquin L&P Corp and Great Western Power Corp

1954
PG&E adds Coast Counties G&E to its system, closing gaps in its San Francisco service area

See page 16



FASTER FAULT CLEARING as shown by the chart becomes possible with new relaying system, according to (left to right) W. J. McLachlan, Manager, Electric Utility Engineering; L. F. Kennedy, Manager, System Relaying, and R. E. Cordray, Manager, Relay Engineering—all of General Electric.

WORLD'S FIRST ALL-ELECTRONIC RELAYING BRINGS INCREASED TRANSMISSION RELIABILITY

New ultra high-speed relay cuts fault-clearing time, improves stability

The world's fastest transmission line protective relay—a revolutionary new electronic system capable of ⅜ cycle operation—will assist electric utilities to reduce fault clearance time, improve system stability, and help solve many of the problems met in higher voltage transmission.

DEVELOPED FOR 330 KV

Developed by General Electric for eventual use at 330 kv, this electronic relaying system was proven in tests by American Gas & Electric Service Corp. on a 132-kv line of Appalachian Electric Power Co. Higher power levels and greater transmission reliability—important factors in overall system operating economy and future load growth—are more satisfactorily handled due to the reduction in fault-clearing time at which this new relay is designed to function (⅜ cycle after a fault occurs) and consequent reduction in outages and fault damage.

This major development in transmission line relay equipment overcomes the mechanical inertia inherent in electromagnetic devices. Its speed of response is independent of both the magnitude or location of the fault, operating with maximum reliability under all load conditions. Germanium rectifiers and tantalytic capacitors reduce the number of tubes required in the fourteen circuits. The equipment can be used on very long lines where fault currents may be considerably less than normal load current.

WRITE FOR FURTHER DETAILS

To assist electric utilities in meeting the problems of higher voltage transmission and circuit loading, General Electric continues to pioneer in even faster relaying systems, higher-speed reclosing circuit breakers, and other protective devices. For further information on electronic relaying write Section 301-253, General Electric Company, Schenectady 5, N. Y.

MORE POWER TO AMERICA

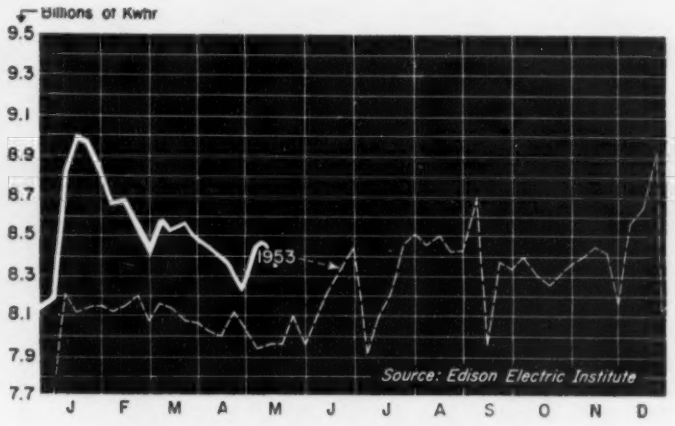
GENERAL ELECTRIC

FIRST ALL-ELECTRONIC RELAYING system, installed at Reusens Station of the Appalachian Electric Power Company on a 132-kv line in Virginia, functions within ⅜ cycle after fault occurs.

VOLUME 141, NO. 21

May 24, 1954

Electrical World



Output Week Ended May 15—8,380,000,000 Kwhr

Seasonally Adjusted Index†—168.1

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
May 15	+5.3	+2.4	−0.4	−3.2	+7.7	+19.8	+7.9	+6.4	+7.3	+5.7
May 8	+6.9	+5.2	+0.3	−0.8	+9.3	+19.2	+12.6	+8.2	+9.5	+7.5
May 1	+5.7	+0.2	+0.5	−4.0	+7.2	+19.6	+14.1	+7.6	+9.3	+6.4

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Mar.	77.8	78.0	73.7
Capacity (Million Kw)	Feb.	92.46	91.68	82.83
Production (Billion Kwhr)	Mar.	38.92	35.21	36.97
Hydro	Mar.	9.92	8.56	10.20
Fuel	Mar.	29.00	26.65	26.77
Fuel Consumption				
Coal (Million Tons)	Mar.	9.89	9.07	9.44
Oil (Million Barrels)	Mar.	6.46	5.70	8.08
Gas (Billion Cu Ft)	Mar.	78.23	75.74	70.16
Sales (Billion Kwhr)	Feb.	32.37	33.45	31.21
Residential	Feb.	10.50	10.96	9.31
Commercial	Feb.	5.60	5.79	5.17
Industrial	Feb.	14.21	14.52	14.76
Other	Feb.	2.05	2.17	1.96
Net Income Class A & B Companies ($ Million)	Mar.	94.29	111.85	91.64
Estimated Dec. '54 Peak (Million Kw)	Feb.	92.5	93.4	96.0
Kwhr per Residential Customer (12 Month Average)	Feb.	2,382	2,363	2,198
Revenue per Kwhr Residential Service (12 Month Average)	Feb.	2.73¢	2.74¢	2.76¢
Canadian Production (Billion Kwhr)	Feb.	5.15	5.63	5.26

Business Statistics

FRB Industrial Production Index†	Apr.	123	125	136
Gross National Production Annual Rate ($ Billion)	1stQtr	358.5	363.5	363.9
EW 4 Industry Production Index†	Apr.	115.1	116.7**	126.5
ENR Construction Cost Index††	Apr.	129.0	128.7	123.6
BLS Consumer's Price Index	Feb.	115.0	115.2	113.4
NEMA Insulation Materials Sales Index†	Mar.	136	120	190
NEMA Electric Appliance Sales Index†	Mar.	105	98	140
NEMA Household Refrig. Sales Index†	Mar.	89	91	108

*Preliminary **Revised †1947-49=100 ††1949=100

THIS WEEK

The Electrical Week 5
Technical Notes 10
News About People 36
Industrial Relations 52
Manufacturers and Markets 59
Regulations 62
Financial 64
Electrical Business Outlook 66

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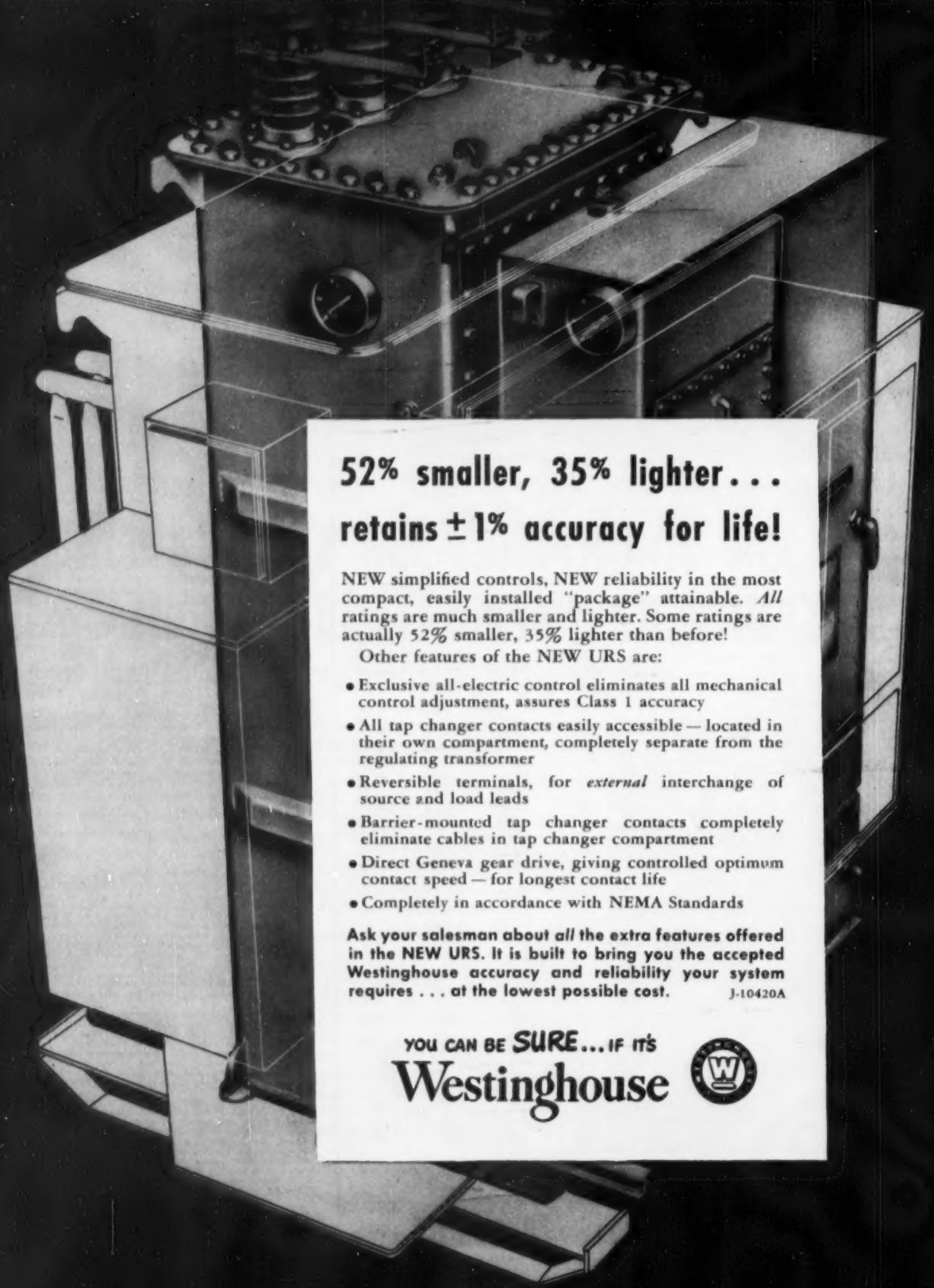
NEW URS STATION REGULATOR...



52% smaller, 35% lighter...
retains ±1% accuracy for life!

NEW simplified controls, NEW reliability in the most compact, easily installed "package" attainable. *All* ratings are much smaller and lighter. Some ratings are actually 52% smaller, 35% lighter than before!

Other features of the NEW URS are:

- Exclusive all-electric control eliminates all mechanical control adjustment, assures Class 1 accuracy
- All tap changer contacts easily accessible — located in their own compartment, completely separate from the regulating transformer
- Reversible terminals, for *external* interchange of source and load leads
- Barrier-mounted tap changer contacts completely eliminate cables in tap changer compartment
- Direct Geneva gear drive, giving controlled optimum contact speed — for longest contact life
- Completely in accordance with NEMA Standards

Ask your salesman about *all* the extra features offered in the NEW URS. It is built to bring you the accepted Westinghouse accuracy and reliability your system requires . . . at the lowest possible cost. J-10420A

YOU CAN BE **SURE**... IF IT'S

Westinghouse

THE ELECTRICAL WEEK

The Issue's News Highlights . . . Private utilities and public power groups express divergent views on proposed amendments to Atomic Energy Act.

Robert LeBaron, Administration advisor on atomic energy urges "crash" program to make possible commercial nuclear power within five years.

Syndicate seeking to build steam plant in TVA area asks conference this week with AEC officials.

House reclamation subcommittee approved the Fryingpan-Arkansas project in Colorado. Measure will come up June 1 before the full Interior Committee. A companion bill already has been voted by Senate Interior Committee. Included in proposed $173-million transmountain diversion project are seven hydro plants designed to generate an average of 505 million kwhr annually.

Utah P&L's Vice Pres and General Manager E. M. Naughton, spokesman for 20 Rocky Mountain utilities, last week told the Hoover Commission Task Force that "whenever electric power may be developed as an adjunct to water resource projects, the Rocky Mountain companies offer full cooperation in planning, producing, and marketing such power."

Ohio State Legislative Service Commission's Public Utilities Committee started an over-all study of state's rate-making formula for electric, gas, and telephone service.

First large publicly owned natural gas project is in the making. It will be known as Southeastern Alabama Natural Gas District and will include about 20 towns around that area. It will be financed through the issuance of tax-exempt bonds by John Nuveen & Co, Chicago.

An initiative which would require authorization of Washington State Legislature before City of Tacoma could build a hydro project on the Cowlitz River has been filed with state's secretary. Sponsored by State Sportsmen's Council, it must be endorsed by 50,000 voters before July 2 if measure is to be on November election ballot.

For first time presentation of Coffin Award at Edison Electric Institute's Annual convention will be broadcast over a coast-to-coast radio network. Ceremony will be carried over CBS Radio network from 10:30 to 11 p.m. (EDT) June 2.

New England's largest steam unit will be installed by Boston Edison in its Mystic Station at Everett, Mass. Its nameplate rating is 125,000 kw and capability 140,000 kw.

NEMA formed a House Heating Equipment Section.

Off the Washington Wire . . . Chairman Gordon R. Clapp left TVA after 20 years of service with the agency. White House was silent on the departure—giving no immediate hint as to Clapp's successor. Meanwhile Harry A. Curtis, senior director, is acting chairman.

Other departures: FPC Commissioner Dale E. Doty's term expires June 22. AEC Commissioner Eugene M. Zuckert is to leave that agency in June.

AEC is opening its materials testing reactor near Arco, Idaho, for limited outside research. Main use will be to test parts which may go into power and other types of reactors.

A standard application form has been adopted by REA for use by potential borrowers. Purpose is to simplify and speed loan processing.

Bonneville Power Administration has awarded a contract for a 115-69 kv, 50,000 kva transformer bank to American Elin Corp, an Austrian firm, on a price bid of $168,300. Lowest U. S. price was $224,816. BPA turned down several previous bids made by the Austrian firm for larger voltage transformers.

Hearing is set for June 1 in Chattanooga, Tenn., by the Hoover Commission Task Force on Water Resources and Power.

Point Pleasant Beach, N. J., residents voted 1,054 to 435 against Jersey Central P&L constructing a plant on Gull Island in the Manasquan River.

Vivien Kellems, president of Kellems Co, Stonington, Conn., has announced her candidacy for Governor of Connecticut.

El Paso Electric and Puget Sound P&L joined the list of Light's Diamond Jubilee participants, bringing the total to 180 companies. There are now 909 cities and towns where Jubilee celebrations are planned.

Buffalo, N. Y., Common Council approved a consumers' utility tax providing for a 2% levy on electric bills, effective July 1 for one year.

North American Co asked SEC approval to sell its office building at 60 Broadway, New York City, for $3.1 million.

Former AEC Chairman Gordon Dean was elected to board of directors of Atomic Industrial Forum, Inc.

Executive Changes—Florida P&L elected Vice Pres R. H. Fite to the post of president and general manager . . . W. H. Dunham was appointed a vice president of Central Maine Power . . . PUAA elected C. Fred Westin of Public Service E&G as its president.

Private, Public Power Split on Atom Bill:

Electric companies lined up with other industry groups to push industrial development of atomic power as Congressional hearings continued last week.

To clear the way for private enterprise and public groups to participate in nuclear power development, the Joint Congressional Committee on Atomic Energy proposes revision of the 1946 act which provides for a federal monopoly in the nuclear power field.

Main opposition to changes in the act came from public power groups and labor spokesmen. But there was little indication this would slow the committee drive to get the new legislation during the current session of Congress.

The Witnesses

Chief electric utility witnesses appearing during the recent hearings were:

- Edgar Dixon, chairman of the Edison Electric Institute Committee on Atomic Energy, representing privately owned utilities.
- Samuel B. Morris, chairman of the Atomic Power Policy Committee of the American Public Power Association, representing publicly owned utilities.
- Clyde T. Ellis, executive manager of the National Rural Electric Cooperative Association, representing electric cooperatives.

Highlights of their testimony appear on the opposite page.

Walker L. Cisler, president Detroit Edison Co, testified earlier on behalf of the Dow Chemical-Detroit Edison industrial study team investigating feasibility of nuclear power (EW, May 17, p 122).

Generally electric company spokesmen endorsed the committee amendments, but vigorously urged a number of changes to clarify procedures. Dixon said private enterprise should be allowed to own as well as lease the nuclear fuel with which electric plants would be fired.

He also called for several changes in the proposed licensing procedures proposed by the committee (page 7).

Public power and labor representatives aimed their main fire at the patent provisions of the revised bill. As originally written, the bill would provide the normal patent protection for new inventions and discoveries made in the nuclear power field. Under the present act, all such patents become the property of the AEC.

Attorney Gilmore Tillman, also appearing for American Public Power Association, charged the bill "would afford opportunity for the creation of a monopoly on a scale never before known in America." He recalled that President Eisenhower in a message to Congress earlier this year had urged a five-year moratorium on standard patents in this field.

The manufacturing industry strongly backed the committee recommendations for standard patent procedure, but Dixon said electric companies have no direct interest in the patent provisions of the bill.

Officials of the Atomic Energy Commission and other government spokesmen are slated to testify on the committee bill today as the hearings go into their third week.

While copies of this second version were not available as EW went to press, it was almost certain that one or two committee changes would be designed to overcome testimony on licensing procedure.

Appeals Procedure

AEC spokesmen were expected to argue against the bill's provision for a three-man review board which would keep an eye on licenses issued by the commission for construction and operation of nuclear power plants. This board was conceived as a body which would handle appeals from AEC decisions on licensing matters. AEC is understood to prefer direct appeal to the courts in such cases.

Following testimony of government witnesses, the Joint Committee will go into closed session to draw up a final version of the bill. Until that time it welcomes written statements from private citizens, companies, or public groups interested in the bill.

Committee plans still call for bringing the final bill to the floors of the House and Senate in early June for full Congressional consideration. Until it is reported to the two houses, it won't be scheduled for debate. However, Senate Majority Leader William Knowland (R-Calif.) has said the measure will get priority consideration in the Senate.

Lone-Wolf Opponent

Democratic Rep Chet Holifield of California appeared to be playing pretty much of a lone-wolf role in building a record of opposition to the bill. As a member of the Joint Committee, he questioned witnesses on the urgency of such legislation.

He has said publicly that he favors a two-package bill. One, which he would support during the current session, would relax the present act to permit exchange of limited defense and industrial atomic information with foreign countries. He has indicated he believed provisions of the bill dealing with domestic nuclear power legislation should be dealt with at a later date—presumably not before next year.

Holifield's most potent weapon appears to be his demand for a comprehensive report on the social, economic, and international aspects of nuclear power development. Under the present act (Section 7B) such a report is required when AEC determines that some use of atomic energy has developed to the point of "practical value." The report is supposed to be submitted along with legislative recommendations of AEC in connection with such development.

Congress has asked for an informal 7B report but up until last week, AEC had not produced it. It is known that the AEC staff has prepared such a report, but word is the five-man commission has declined to underwrite it.

Public power and labor spokesmen have sided with Holifield in demanding the report, arguing that legislation should not be considered until the report is publicly available.

Here's How They Stand on Its Key Provisions

All sections of bill as presented.

Electric Company View

". . . with certain modifications . . . [it is] a major step in the legislative program of encouraging private industry in the production of electric power and energy through use of atomic energy." (Dixon)

Public Power View

"It is our opinion that this bill should not be passed in any form." (Ellis) "The members of the American Public Power Association were and are tremendously disturbed by these bills. . . ." (Morris)

Licensing Provisions

Section 185: Provides for issue of construction permits for nuclear power plants. Licenses would come later upon compliance with licensing requirements.

Electric Company View

"Any bona fide licensee would expect to comply. But he would also . . . expect to have the decision of the commission [AEC] that he is embarking upon a project which, upon compliance, would result in a license." (Dixon)

Section 186, 187:

Would give AEC authority to modify or revoke nuclear plant licenses for a wide variety of reasons.

Electric Company View

" . . . Such action should be permitted only under specified standards . . . and under adequate safeguards designed to protect investors and consumers." (Dixon)

Public Power View

(on Sections 185, 186, 187)

"We believe these provisions are not as well defined as those which apply to the less involved licensing of hydro projects as defined in the federal power act." (Ellis)

Section 103:

"No corporation or association may be a licensee if it is owned or controlled by a foreign corporation or government or if more than five per centum of its voting stock is owned or their representative or if any officer, director, or trustee is not a citizen of the United States."

Electric Company View

" . . . As a practical matter, the requirement . . . would be virtually impossible to administer . . . it is submitted that the section be amended to provide for a test based upon a finding of domination or control by aliens." (Dixon)

Public Power View

No statement.

Section 103:

"Each such license shall be issued for a specified period not exceeding 25 years, and may be renewed upon the expiration of such a period."

Electric Company View

"I think the period is too short for one thing." There should be at least a 40-year amortization period, "or . . . a provision where, if you observed the provisions of your license, you could absolutely count on a renewal of your license." (Dixon)

Public Power View

"We like the amendment . . . this shorter period is more desirable for licenses which involve a technology which is so new and which is constantly changing . . . these licenses should be subject to recapture . . . at time of expiration if it is desirable to do so." (Ellis)

Patents

Section 153: Would eliminate present requirement that AEC hold all patents relating to utilization of nuclear energy—thus providing for standard patent procedure for nuclear power inventions and discoveries.

Electric Company View

" . . . We have confined our amendment to matters primarily or directly affecting our industry and have left patent and other matters to those who can speak with more immediate authority." (Dixon)

Public Power View

"It is our belief that such patents should not be allowed at this time. The bill would not merely permit but invite the creation of a patent monopoly." (Morris)

Preference Clause

Section 104: If energy which may be utilized is produced in the production of special material at . . . facilities owned by the United States, such energy may be used by the Commission [AEC] or sold to other government agencies or to publicly or privately owned utilities or users at reasonable and nondiscriminatory prices."

Electric Company View

Changes were suggested by Dixon to prevent "other government agencies" from reselling such power and to remove any possible suggestion that publicly owned utilities would get priority in purchasing such power.

Public Power View

"We were disappointed that this section was not amended to include preference in the marketing of power for rural electric and public systems from nuclear power facilities owned by the United States." (Ellis)

'Crash' Program . . .

. . . for development of commercial nuclear power urged by Administration aide

An Administration adviser on atomic energy last week called for an all-out "crash" program to speed development of peaceful uses of the atom, particularly for power.

In a speech at dedication ceremonies for the Trane Co's new research laboratory at LaCrosse, Wis., May 20, Robert LeBaron said such a program could result in practical nuclear power within five years.

LeBaron is assistant to the Secretary of Defense and chairman of the Military Liaison Committee of Atomic Energy Commission.

Asks New Manhattan District . . . The atomic energy adviser declared that the era of commercial atomic power is closer to us than most people realize. He proposed immediate formation of a Manhattan Engineer District for peacetime power. (Manhattan Engineer District was the name of the group which developed atom bomb.)

Noting that Dr Lawrence Hafstad, director of AEC's Reactor Division, had said two generations of reactors stood between us and the threshhold of nuclear power, LeBaron declared that experience gained from the construction and operation of the first group of reactors could be incorporated into the second group.

"When this second series of reactors has been built, operated and tested, we will then have reached the stage when we know enough about atomic power plants to build them on a basis competitive with present-day methods," he said.

Nuclear Power in Five Years . . . LeBaron estimated that under the "crash" program commercial nuclear power could be generated within five years. On an ordinary, step-by-step basis, he thought it would take ten years—five years to build and understand the first generation of reactors and another five for the second generation.

In advocating the "crash" program LeBaron stressed that he is not advocating wasting the taxpayers' money. He said: "I am emphasizing the point that there is much more that can be done."

Lofty Tower Rises on Shore of Sicily

The transmission crossing tower on the shore of Sicily which will support one end of a 2.268 mile, 220-kv overhead line across the Straits of Messina is almost fully assembled. Completion is scheduled for the beginning of June. Shortly after that time assembly will start on a similar tower on the Calabrian coast. Both towers will be 225 meters (738 ft) from the soil level. The six cables will be distributed four at 196 meters (643 ft) and two at 218 meters (715 ft). Maximum clearance above the water will be 70 meters (230 ft).

Senate Committee Raises Appropriations for TVA

Tennessee Valley Authority backers in the Senate were trying to get up enough steam to break through the funds barriers imposed by the House and Senate Appropriations Committee.

As reported by the Senate committee the bill for TVA funds for the next fiscal year would provide only $129.6 million for the agency. This was $12.2 million less than requested by President Eisenhower in his budget message and $58.8 million less than was provided for the agency last year.

However, it was still $26 million above the House-approved figure for TVA. Also the Senate committee reiterated its endorsement of a 1948 funds act which prohibits TVA from using power revenues for new power construction without specific Congressional approval.

In raising House-approved funds for Atomic Energy Commission from $1,189.9 million to $1,232.8 million, the Senate committee urged restoration of an additional $3.1 million for physical research and $12 million for new ore processing plants.

There were no major changes in House funds recommended for Federal Power Commission and Securities and Exchange Commission.

Action on Appropriation Bill

Agency	Eisenhower Budget	House Bill	Senate Committee
	(Millions of Dollars)		
TVA			
Salaries and construction	141.8	103.6	129.6
AEC			
Operating expenses .	1,105.6	1,093.5	1,102.8
Plant and equipment	236.3	96.5	130.8
FPC			
Salaries and expenses ...	4.1	4.1	4.1
SEC			
Salaries and expenses ...	4.8	4.7	4.8

Co-ops Fight for SPA Pacts

Cooperative leaders of Oklahoma and Missouri ask Congress to revive contracts with government agency

Oklahoma and Missouri cooperative leaders are fighting a rear-guard action to revive the power contracts between federated cooperatives in the two states and Southwestern Power Administration.

At two recent hearings before Senate committees, co-op spokesmen pleaded for Congressional sympathy and possible support in reversing previous actions which denied funds to finance the contracts.

Old Controversy . . . This was the latest round in a controversy that dates back to 1950 when five generation and transmission cooperatives in Oklahoma and Missouri contracted to lease transmission lines and sell generation output to SPA in return for usable power for co-op customers. Two court suits arising out of the contracts are now being appealed. Congress has refused to allow funds for SPA to carry out its part of the contract.

The co-ops are now operating under interim agreements with SPA pending negotiation of integration agreements with electric companies in their area.

Electric company spokesmen told a Senate Appropriations subcommittee recently that negotiations on most of these integration contracts were proceeding slowly, but progress was being made. Attorney Richard L. Arnold, speaking for the private utilities, said he would not oppose the grant of funds for continuing the interim contracts as an "emergency stop-gap measure."

Oppose Restoring Contracts . . . However, he told the committee, the companies are unalterably opposed to the restoration of the lease-option and power contracts which were suspended and rendered inoperative by Congress for the present fiscal year.

Co-op leaders, headed by Truman Green, manager of the Central Electric Power Cooperative of Jefferson City, Mo., told the same subcommittee they were still counting on revitalization of the old contracts. Meantime, they also asked for an appropriation of $1.7 million for SPA to continue the interim contracts.

Appearing before the Senate antimonopoly subcommittee, the co-ops sought to get their views on the record. North Dakota Sen William Langer, sometimes described as a renegade Republican, was sole committee member present.

Before Langer, Co-op Manager Green recounted his court suit to reinstitute the power contracts. He testified that failure to revive the contracts would result in wholesale rate increases from the current 6 mills to as much as 12 or 13 mills per kwhr.

Green told Langer that Central is in a "very serious financial condition due to lack of working capital." He said SPA had not yet paid money it owes Central under the interim contract now in effect.

Burch Says Syndicate Seeks Parley with AEC

An eastern syndicate proposing to build a $100-million steam plant to supply power to the Paducah (Ky.) Atomic Energy Commission installation is ready to proceed with negotiations with the government. Lucius E. Burch, Jr. of Memphis, Tenn., attorney for the syndicate, said that the group has secured the services of a nationally known engineering company to replace the firm of Gibbs & Hill, Inc, which withdrew from negotiations (EW, May 17, p 121).

Burch said his clients were seeking a conference this week with officials of the AEC and the Budget Bureau to discuss terms of a proposed contract.

At the same time, the Memphis attorney identified individuals and firms composing the syndicate in addition to Walter Von Tresckow, a financial and economic consultant, who heads the group. They are:

- Caldwell, Marshall Trimble & Mitchell of New York, representative of several of the nation's largest institutional investment houses.
- Harvey Weeks of New York, former vice president of the Hanover Bank of New York.
- Schwartz, Nathanson & Cohen of New York, attorneys specializing in corporate finance.
- Robert W. Larrow, Burlington, Vt., attorney.
- Salomon Brothers & Hutzler of New York, a large Wall Street investment firm.

Burch declined to name the engineering firm which the group has employed.

He said the plant would produce power for the government at a rate of approximately 4 mills per kwhr. This is approximately the same rate the Tennessee Valley Authority charges for power sold to municipalities.

Idaho Power Plan Hit at Hells Canyon Hearings

Four witnesses advocating federal development of Hells Canyon last week continued the National Hells Canyon Association's testimony in favor of the high dam.

Owen W. Hurd of Prosser, Wash., manager of the County Public Utility District, claimed the NHCA has the backing of 55% of the Pacific Northwest in favor of a federal high dam at Hells Canyon.

Another witness, Elmer McClure of Portland, Ore., speaking for the Washington State Grange and the Oregon Farmer's Union, said: "Federal development permits a coordinated program that assures an optimum utilization of all the resources of the region."

Private utility development, he said, "means the exploitation of the hydroelectric dam sites solely for the purpose of producing electric power at the greatest possible profit to the utilities." Under cross-examination by R. B. Parry, attorney for Idaho Power, McClure admitted that private industry is entitled to some profit.

The vice-president of NHCA, Vincent M. Cleveland of Vancouver, Wash., and chairman of the Northwest Public Power Committee on the Wholesale Rate, said he was opposed to Idaho Power because private power "has the tendency to serve concentrated areas while neglecting rural areas."

John M. George of Lewiston, Idaho, representing REA cooperatives in the Pacific Northwest said that the approximately 400,000 citizens he represented are 100% in favor of the high dam.

Putting Advertising to Work for You

SAMUEL L. FRIEDMAN,

Director of Public Relations, Los Angeles Department of Water & Power, Los Angeles, Calif.

This abstract of Mr. Friedman's address, made May 4 before the American Public Power Association's annual convention at Chicago, is being published not only because it is news but also because it serves as an editorial in support of all utility advertising. Public power proponents and political leaders have frequently bitterly criticized the investor-owned companies for their advertising expenditures. But here the public relations director of the largest municipal power system in the United States advocates these expenditures for public power systems. His reasons are those we have heard so many times from his colleagues in the private power field. Perhaps the best lesson that can be drawn from this is that all utilities, whether publicly or privately owned, owe it to their managements, owners, and customers to do a good advertising job—The Editor.

Often people ask, "Why should a public utility advertise if it has a monopoly in supplying its community?" The answer seems clear. A utility needs to advertise for the same reason as any other business—to bring about public understanding of the organization's aims, policies, and activities as they affect its customers and the community at large, and to promote its business and increase its sales.

An enterprise that is deeply affected with the public interest, such as a publicly owned water or power system on which the life of the entire community depends, plainly needs an informed public. Through advertising a public power system can disseminate information, increase public confidence, and contribute to the growth of its business and the sale of its product, electricity.

An important distinction between advertising and other public relations tools is that advertising is paid for and therefore subject to complete control. Advertising is the paid "commercial," designed to "sell" your products, services, or ideas. Paid advertising enables you to say precisely what you want, choosing your media, audience, and timing with a high degree of exactness.

Before planning an advertising program, the publicly owned utility should carefully consider its purposes and uses. If advertising is designed to obtain public support of proposals being submitted to vote of the people, such as bond issues and charter amendments, it may encounter serious objections on legal grounds, or on the basis of public policy. If advertising is used to obtain a friendly public attitude on a matter currently under consideration by a legislative body, such as approval of rate changes or enactment of an ordinance or state law affecting the utility's interest, trouble may be expected. However, there should be no hesitancy in making use of advertising to accomplish justifiable purposes within the bounds of proper publicly owned utility practices.

Public Knows Little . . . Institutional advertising opens broad new vistas to explore. Often we are surprised to learn how much the people do not know about our organization, or how much they know that is wrong. In Los Angeles where there are so many newcomers, there is a continuing need for basic education about the municipal water and power services. Despite long publicity and advertising, many citizens do not even know that the Department of Water and Power is owned by the city. Large numbers have only the vaguest ideas about the sources of the city's water and electricity.

Institutional advertising enables the public power agency to take the public into its confidence on its needs for capital expenditures to meet growing community needs, to give assurance that rates are the lowest possible, to explain the reasons for extensions and additions. It also can help to educate the public on the utility, the economics on which it is based, and the system's long-range goals.

A few years ago there was widespread misunderstanding of the economics of the Los Angeles system. Any sizable net income was taken to mean unnecessarily large system profits; surplus was believed to consist of millions in stored-up cash. Institutional ads helped correct these misconceptions. Surplus was shown as funds invested in the system and not as money in the cash drawer.

In planning an advertising program, the question arises as to how much should be spent. Several methods can be used: a percentage of sales, a fixed amount per customer or new customer or inquiry desired, or a percentage of surplus. Probably the most satisfactory method is to base the advertising budget on an estimate of needs. This can be checked against total sales or revenues to determine that it is not too large or too small.

A study of 234 companies by Sales Management Magazine showed utilities were in the lowest in advertising expenditures of 17 business and industrial groups. Utilities spent approximately 6/10 of 1% of their gross sales or revenues. Publicly owned utilities probably are spending only about 3/10 of 1% of gross revenues.

Such figures are not exact guideposts. The problems of advertising increase with the size and complexity of a city, its degree of industralization, the advertising activity of competing sources of energy, and other factors. The amount of money which should be spent is closely related to the needs. These needs can only be determined on the basis of careful appraisal of local conditions.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Heat absorbed in the superheating and reheating section of many modern boilers comprises more than 40% of the total heat input.

Embrittlement of ferrite-bearing austenitic weld deposits is largely due to the formation of the brittle sigma phase.

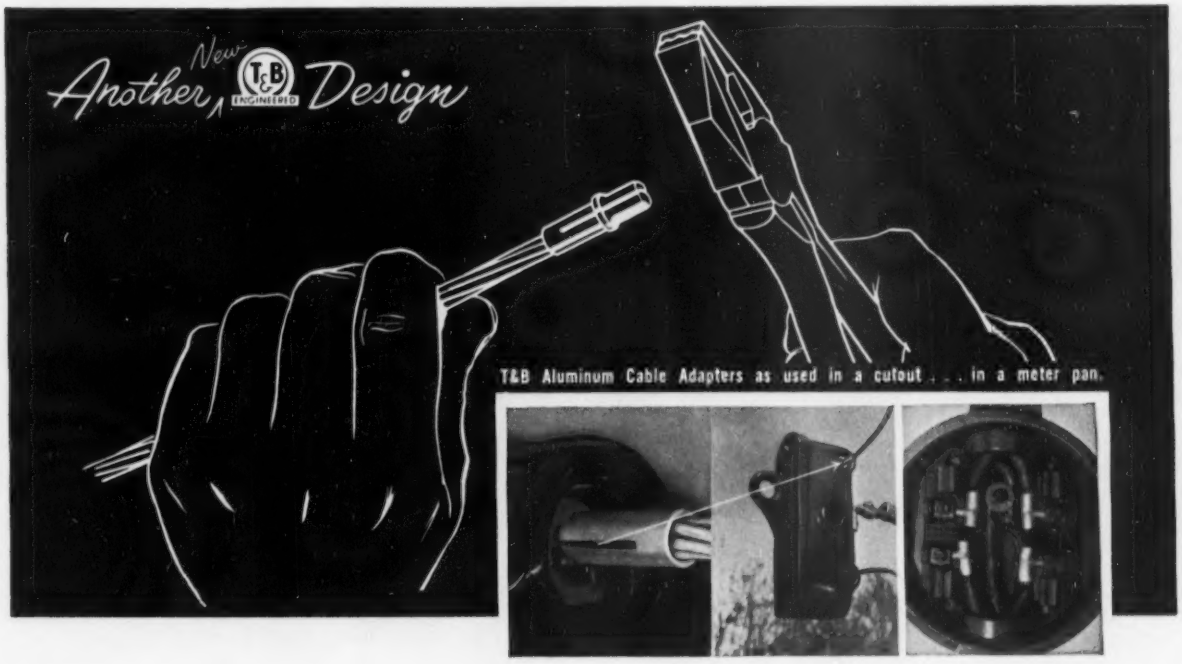
Kiln-dried southern pine poles are stronger than steam-seasoned but no stronger (if as strong) than air-seasoned creosoted poles.

Frequency response of high-resistance, physically long voltage dividers is primarily determined by the stray capacitance to ground. Response of low-resistance, physically short dividers is determined by the resistance change with frequency.

IF YOU'RE WIRING WITH ALUMINUM . . .

Utility Engineers are now installing aluminum cable in many places where only copper had been suitable. Equipment such as transformers, capacitors, cutouts, switches, and meter pans, having terminals designed for copper conductors, are now being wired to aluminum and A.C.S.R. with little or no difficulty.

How? T&B's new Aluminum Cable Adapters. They're made of heavily-tinned copper alloy; take up little more space than the cable; install in a jiffy. A lineman or electrician merely taps one onto the end of the conductor, then clamps the adapter as though it were copper conductor. "Straight" and "flag" types are available. The flag type is best for connections at right angles to cable outlets.



One of the outstanding features of these new adapters is the serrated bore. As the adapter is tapped onto the cable, the serrations bite through the aluminum oxide coating. The high-conductivity connection thus formed is maintained, despite weather and moisture, by an oxide inhibitor precoated in the bore. The clamp end is slotted and spring-like to maintain pressure during thermal expansion and contraction.

These versatile Cable Adapters are opening up many new applications for aluminum cable. Sizes for cable up to #2 Str. at present. If you're wiring with aluminum, you might possibly have a unique application. If so, let us know about it. We'll be glad to send you a free sample of the adapter and descriptive literature. Write to The Thomas & Betts Co. today.

Note how the bore serrations have scraped through the oxide coating on the cable end.

LOOK FOR THIS SIGN — AUTHORIZED DISTRIBUTOR T&B ENGINEERED

IT'S THE MARK OF AN AUTHORIZED T & B DISTRIBUTOR

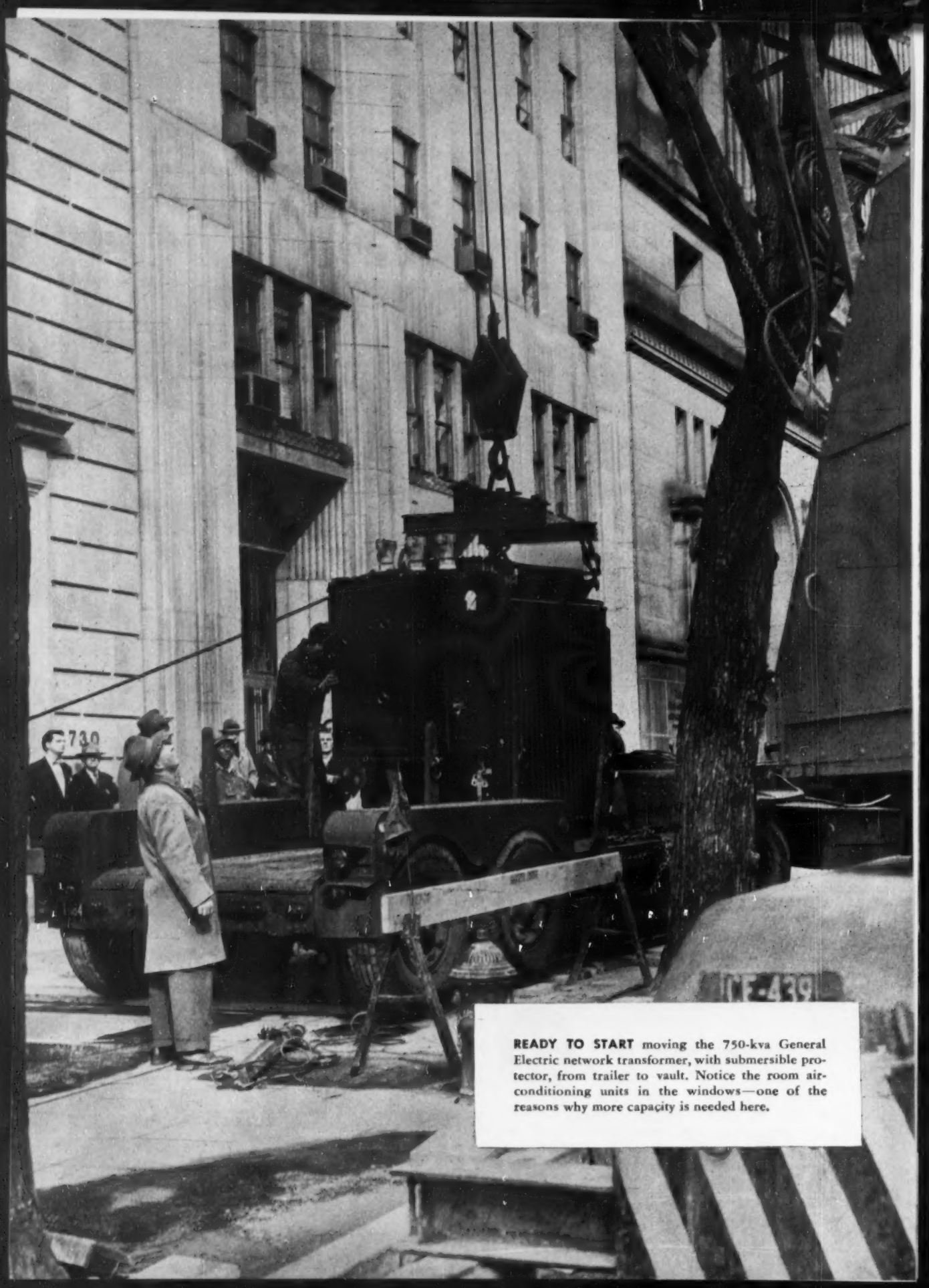
The complete line of T & B fittings for conductors and raceways is sold only by recognized electrical wholesalers. It's our way of assuring you the service and savings of a friendly local source. Call him for all your electrical needs. T-415

THE THOMAS & BETTS CO.

INCORPORATED

14 Butler Street • Elizabeth 1, New Jersey
Thomas & Betts Ltd., Montreal, P.Q., Canada

MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898



READY TO START moving the 750-kva General Electric network transformer, with submersible protector, from trailer to vault. Notice the room air-conditioning units in the windows—one of the reasons why more capacity is needed here.

Potomac Electric, Washington, D.C., installs G-E network unit to meet extra-heavy load demands

System reinforced with 750-kva G-E transformer and network protector

The flexibility and ease of expansion provided by a secondary network system certainly "pays off" for Potomac Electric Power Company in downtown Washington, D. C. Flexibility of the system permits load growth additions with minimum interference to service in the highly concentrated downtown area.

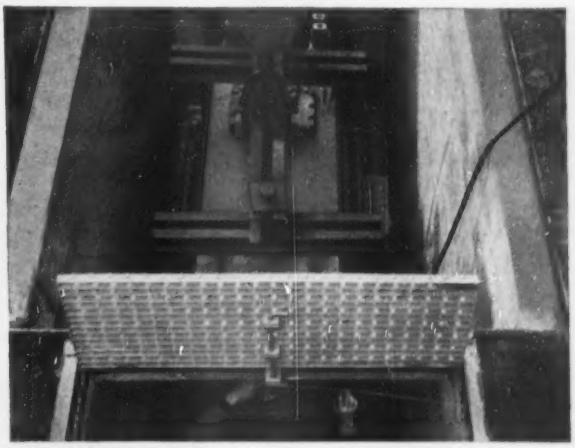
The financial district is experiencing a phenomenal growth and the consequent heavier load requirements, including air-conditioning in existing buildings in the area, necessitated installation of this 750-kva G-E network transformer. The unit, equipped with a submersible automatic network protector, is located at 730—15th Street, N. W., directly in front of the American Security and Trust Company building.

Compactness of G-E network units permits minimum vault depth (7 feet to roof slab) for lower installation cost.

It pays to start a network. Although the change from a radial to a network system means substantial initial expense, future increases in capacity require less investment with a network system. With a growing load, the sooner the network system is started, the lower the ultimate cost. Why not investigate the advantages for your system?

For help in solving your network problems, and for complete information on the many advantages of G-E standardized network units, get in touch with your nearest G-E Apparatus Sales Office, or write for Bulletin GEA-5024, General Electric Company, Section 431-201, Schenectady 5, N. Y.

ALMOST IN PLACE and with minimum inconvenience, even in a congested downtown area. Note the G-E submersible automatic network protector on the low-voltage end of the transformer.



CENTERING UNIT in vault prior to cabling. Convenient location of cable terminals on G-E units makes minimum size vaults practical—simplifies connections for fast installation.

You can put your confidence in—

GENERAL ELECTRIC

Insulator Prices

vs.

Insulator Performance

So-called "bargain" insulators are supposed to cut costs.

That they do, but *first* costs only . . . and by only a few cents per insulator.

Price is hardly a measure of the long range performance which is naturally your first concern when considering insulators. For, as you know, price tag savings can be wiped out many times by failure of a single insulator on any of your transmission or distribution lines. Premium performance rarely comes at a bargain price.

Be safe! Invest in the traditional dependability of Locke Insulators.

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

NW Atom Team

Five private utilities to pool resources in studies on feasibility of nuclear power plants

Aim of agreement reached by five private utilities in the Pacific Northwest with Atomic Energy Commission, whereby they will pool their technical resources to study the feasibility of a nuclear power reactor, is to enable the group to be prepared for possibility of eventually meeting the area's increasing power demands with nuclear power.

Participants . . . The five companies involved are Washington Water Power, Pacific Power & Light, Montana Power, Portland General Electric, and Mountain States Power.

Kinsey M. Robinson, president of Washington Water Power, announced the action was "still a further step taken by the five companies to explore every field and opportunity to supply the ever growing power requirements in the Northwest."

"This five-company group is aware of its continuing responsibility and obligation to the economy of the area," Robinson said, "and we are pleased to have the opportunity to participate as another team in development of this new source of power."

Terms of Agreement . . . He said terms of the agreement include:

1. Determining the engineering feasibility of designing, constructing and operating a nuclear reactor.

2. Examining the economic and technical aspects of building such an installation;

3. Determining the research and development work required before a project could be undertaken;

4. Offering recommendations in a report to AEC concerning such a reactor project and how it might be carried out.

EEI Convention Sidelight

Added attractions at Edison Electric Institute's 22nd annual convention in Atlantic City June 1-3 will be meetings planned by two of the New Jersey resort's service clubs to honor the memory of Thomas A. Edison. When the Rotary Club honors Edison at its weekly meeting on Tuesday, June 1, at Hackney's Restaurant, the organization will have as guest speaker George E. Stringfellow, senior vice president of Thomas A. Edison, Inc, of West Orange, N. J. On Wednesday, June 2, The Exchange Club will hear an address by Vice Admiral Harold G. Bowen, U.S.N. (ret), executive director of Thomas Alva Edison Foundations, Inc. Both speakers were acquainted with Edison for a number of years.

Dr Erwin F. Lowry . . .

. . . Wins IES Medal

Dr Erwin F. Lowry of Sylvania Electric Products, Inc, has been named recipient of the 1954 Gold Medal of the Illuminating Engineering Society. He will be presented the medal at the society's annual National Technical Conference at Atlantic City, N. J., on Sept. 13. The medal, highest honor in the field of illumination, is awarded for meritorious achievement for furthering the profession, art or knowledge of illuminating engineering.

Dr Lowry, first physicist engaged in light source research chosen to receive the IES medal, has for the past 25 years devoted his efforts to specialized problems involved in the design and development of cathodes for gas filled tubes. Since 1940 he has been associated with the Lighting Division of Sylvania, where he is now manager of the Lighting Engineering Laboratories.

A fellow of IES, he has been chairman of the society's Light Source Committee and Board of Fellows.

POWER BRIEFS

● First new generating construction program since 1942 has been announced by Puget Sound Power & Light Co. Steps are being taken by the utility for possible new hydroelectric projects on the Columbia and White Rivers that would result in daily capacity being raised 30,000 kw each year for the years 1955 through 1957.

● First of 12 generators at the new Sir Adam Beck Station No. 2 of the Hydro-Electric Power Commission of Ontario at Niagara Falls has been placed in operation and is supplying a limited amount of power to the 60-cycle service of the commission.

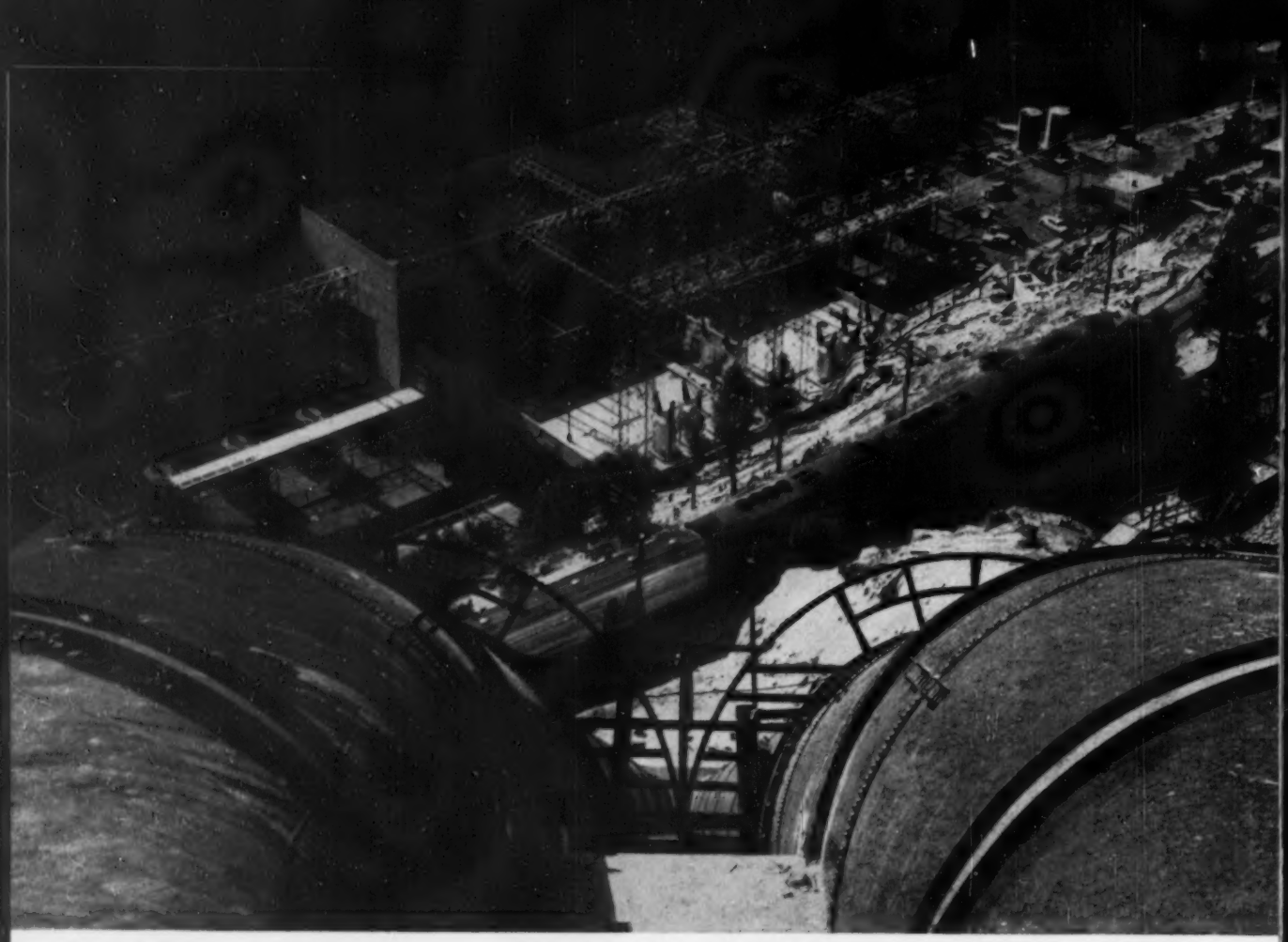
● Establishment of The Institute for Advanced Engineering has been announced by the University of Texas, Austin. The institute, reported to be the first of its kind in the Southwest, offers practicing engineers an opportunity for "briefing" on new advances in science and engineering that have occurred since graduation. Three courses scheduled for this summer include advanced experimental stress analysis, new developments in communication theory, and composition and properties of oil well drilling fluids.

● New York State Power Authority's new general counsel is Thomas F. Moore, Jr. The newly appointed official resigned as first deputy commissioner from the State Industrial Commission to accept the power authority post.

● El Salvador's $25-million hydroelectric project on the Rio Lempa River is scheduled to be opened formally with elaborate ceremonies on May 28. Project's ultimate generating caacity will be 75,000 kw.

● Dallas Power & Light Co has placed a 70,000-kw turbine generator in operation at its Griffin Street Plant in Dallas. Installed at a cost of $8,750,000, the generator will boost DP&L's capacity to 482,000 kw.

● Work is expected to get underway June 1 on Portland General Electric Co's Timothy Meadows Dam on the upper Clackamas River, Ore. Estimated to cost $2.2 million, the dam, located on the Oak Grove fork of the river, will add about 10,500 kw of firm power capability for three downstream Clackamas River plants of the utility.



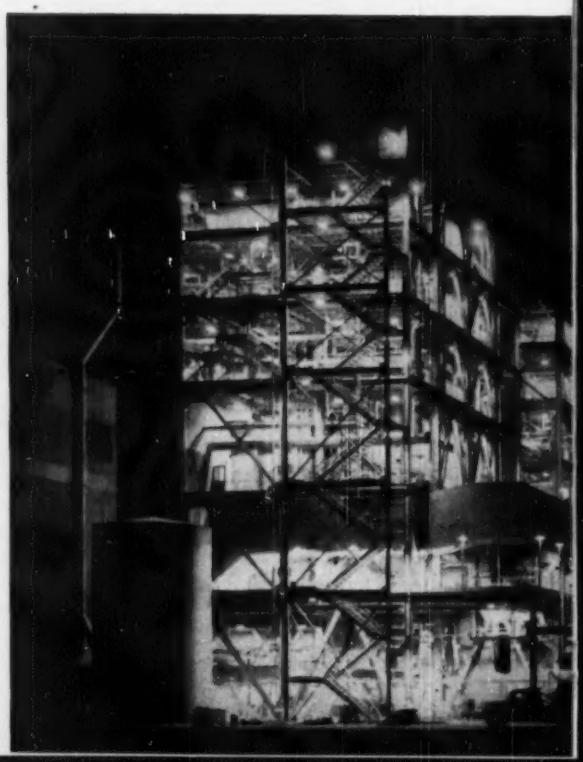
To the Big One, Add Coast Counties G&E

That giant of private utilities, Pacific Gas & Electric Co, has added another corporation to its vast properties, bringing some 108,500 new customers into the far-flung system which already serves well over 2.5 million Californians.

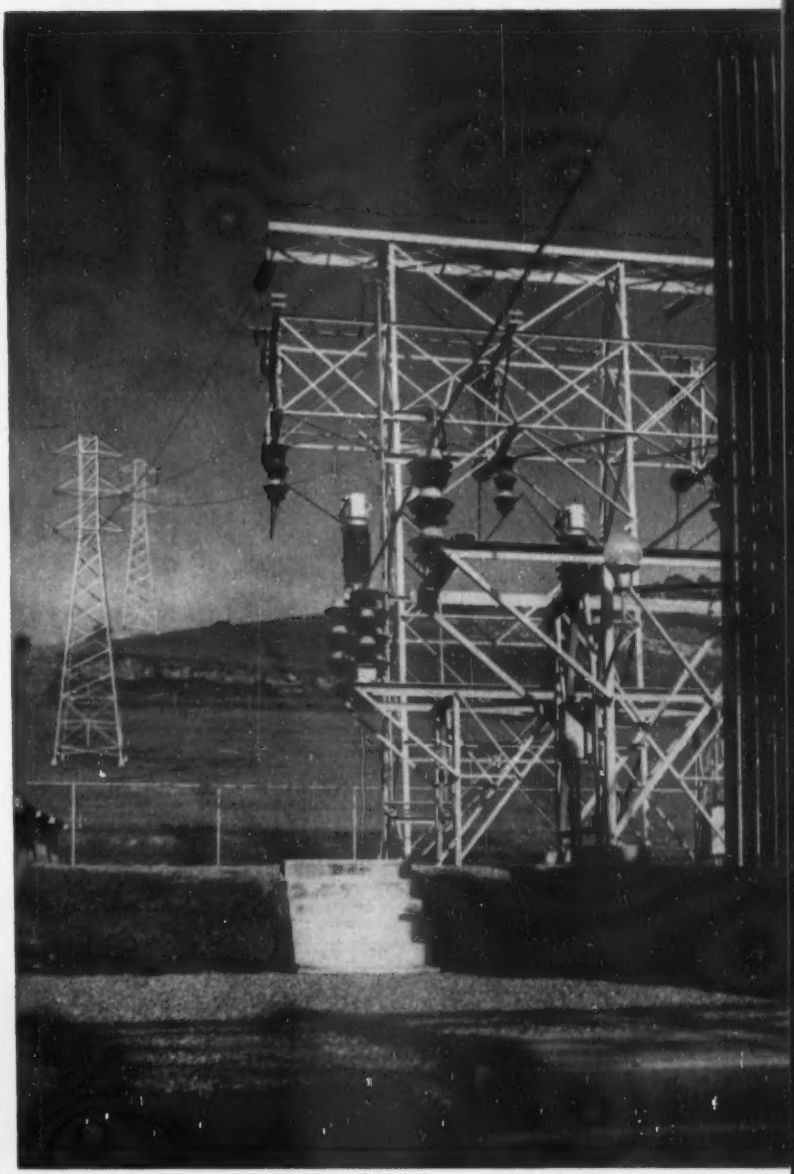
In a merger agreement approved by state and federal authorities, PG&E, with headquarters in San Francisco, acquired controlling interest in Pacific Public Service Co, holding company for Coast Counties Gas & Electric Co and two smaller subsidiaries. The transaction yielded PG&E 84% of Pacific Public Service common stock, and 60% of the total outstanding voting stock.

Although PG&E cannot say exactly what the merger will cost, it will charge $25,849,000 on its books if it acquires all the common stock.

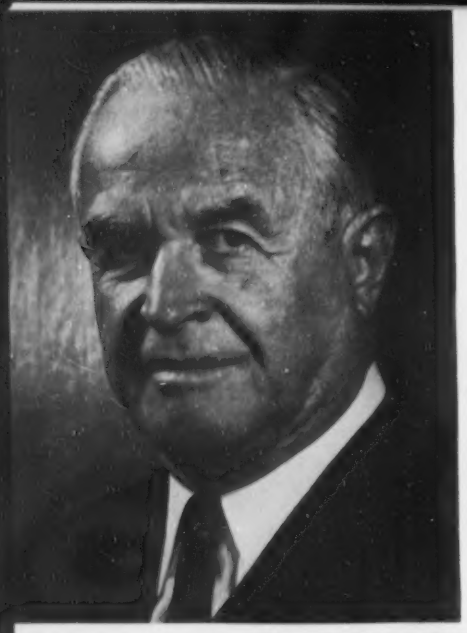
Pacific Public Service Co, with its three subsidiaries—Coast Counties Gas & Electric Co, Gas Lines, Inc, and Natural Gas Corp of California, has fixed assets of over $33 million. Its gross operating revenues last year were $22,827,028. The financial forecast for 1954 indicates



● PACIFIC GAS & ELECTRIC CO has made growth its business—with acquisition of Coast Counties G&E, it represents a merging of 520 companies over a hundred year period. On the basis of assets—about $2 billion gross—it is the country's biggest combination utility. It serves an 89,000 square mile area in northern and central California—an area equal in size to all the New England States, New Jersey, Delaware and Maryland combined. With the latest merger it has 2,729,168 customers—1,513,442 electric; 1,194,098 gas; 20,915 water and 713 steam. The system was once predominantly hydro, as represented by 110,000-kw Rock Creek Plant, left, on the north fork of the Feather River. But thermal power, as represented by huge Contra Costa Plant (now 575,000 kw) below, now far outdistances water power.



● COAST COUNTIES GAS & ELECTRIC CO, whose Paul Sweet Substation in the Santa Cruz district is shown above, served areas that were islands in Pacific G&E territory. With the merger, integration of the two will not prove difficult, since Coast Counties tapped PG&E highlines for most of its power. The service area is interlaced with the larger company's transmission lines. Coast Counties itself has 268 miles of transmission and 1,697 miles of distribution lines. On these lines are nearly 46,000 customers. All of the smaller outfit's 611 employees may remain at their jobs when the changeover has been accomplished.



• JAMES B. BLACK is president of Pacific G&E and board chairman of newly acquired Pacific Public Service Co, parent of Coast Counties G&E. Four other PG&E directors joined the PPS board. Although born in Illinois, Black is a long-time resident of California. Graduating from the University of California with a ME degree in 1912, he began utility work with Great Western Power Co. At 33 he was named vice president and general manager. PG&E purchased Great Western in 1930, and in 1935 Black became its president.

• JACK K. HORTON has been president of Pacific Public Service and its subsidiary, Coast Counties, since 1952. A lawyer, he began his career with the firm as its secretary and legal counsel in November 1944. In March 1951 he was named executive vice president and a year later succeeded to the presidency. Today, at 38, he enters the PG&E system as one of its younger executives.

consolidated earnings will be $1.76 a share, compared to $1.67 for 1953.

Coast Counties' service areas are islands in PG&E territory. The company sells gas in Contra Costa County at the north end of San Francisco Bay, but not to the county's biggest city, Richmond, a PG&E customer. On the coast, it delivers both gas and electricity to the Santa Cruz, Watsonville, Gilroy, Hollister area. It sells gas to a few communities on the west side of the San Joaquin Valley.

Key Property . . . With its 611 employees, all of whom may stay with PG&E after the merger, Coast Counties is the key property of the holding company. Gas Lines, Inc, owns no pipeline properties, but is allocated excess capacity by Coast Counties to deliver gas to its five customers. Natural Gas Corp of California, an exploration company, has tapered off its ventures.

Electric properties add up to 268 miles of transmission lines, 1,697 pole miles of distribution lines. Gas properties include 46 miles of transmission mains and 1,389 miles of distribution mains.

Savings resulting from consolidation will be relatively small on the coast where the smaller company sells both gas and electricity, but more impressive where each firm sells a separate service.

Sizable Savings . . . Annual reduction in operating expenses is estimated by PG&E at $845,315. Federal and state taxes will amount to $455,794, leaving net savings of $389,521.

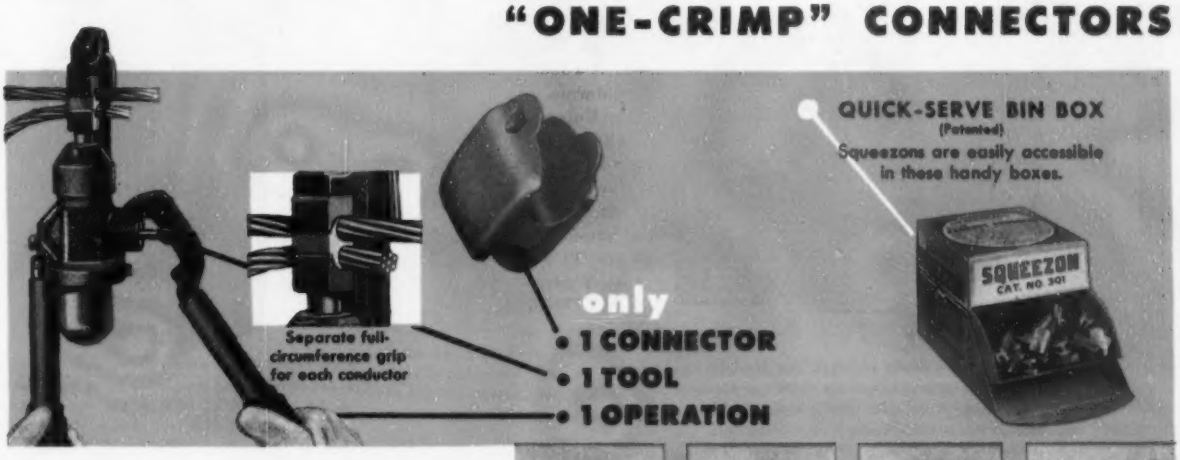
Since Coast Counties bought all its electricity and most of its gas from PG&E, the merger in effect lops off a middleman. PG&E has lines cobwebbed over the whole coastal area served by Coast Counties, so distribution will be no great problem when the two companies are integrated.

The merger is one more step in the consolidation of Pacific Gas & Electric into the country's largest private utility. In its hundred years, it represents a merging of 520 companies.

What's in store for the future? A hint came recently when a company spokesman testified before a Hoover Commission task force on power. PG&E is ready and willing, the spokesman said, to purchase all power facilities of the federal Central Valley Project, whenever the Eisenhower Administration is ready to sell.

Tap the Line in Half the Time with SQUEEZON

"ONE-CRIMP" CONNECTORS

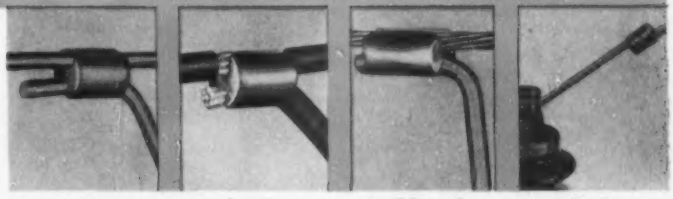


The Fast, Low-Cost Way to Make Overhead Connections

One crimp . . . and you've got the connection!

That's all it takes when you make a line joint with a Squeezon and a Squeezon compression tool. You get a *better* connection . . . a perfect bonded, permanent joint. That's because Squeezon connectors provide *separate*, full-circumference grip on each conductor, eliminate galvanic corrosion on transfer surfaces.

Squeezon economy and all-around utility will please you. Your line crews can handle any job in half the time and at a fraction of the cost of conventional methods. One Squeezon tool and two types of connectors . . . the aluminum and the solid copper . . . meet all line requirements.



Copper Squeezon
One operation of the Squeezon compression tool permanently bonds this type of joint.

Aluminum Squeezon
Aluminum connector for aluminum conductor provides large area contact—prevents cold flow, for aluminum-to-copper or copper-to-aluminum. No special connector necessary.

For T Connections
Costly special connectors are eliminated by the use of Kearney Squeezon, for aluminum-to-copper connection.

Tap On
Squeezon's weld-grip high pressure bonding makes perfect aluminum-to-copper terminations.

Dead-Ends
One crimp per Squeezon saves time when multiple connectors are used.

Stirrup Tap
Two Squeezons and a short piece of wire make an inexpensive, easy-to-install stirrup, insures a rigid arc and corrosion-proof connection on hot lines.

Line Splice
Line splices are better electrically and mechanically with Squeezon sleeves.

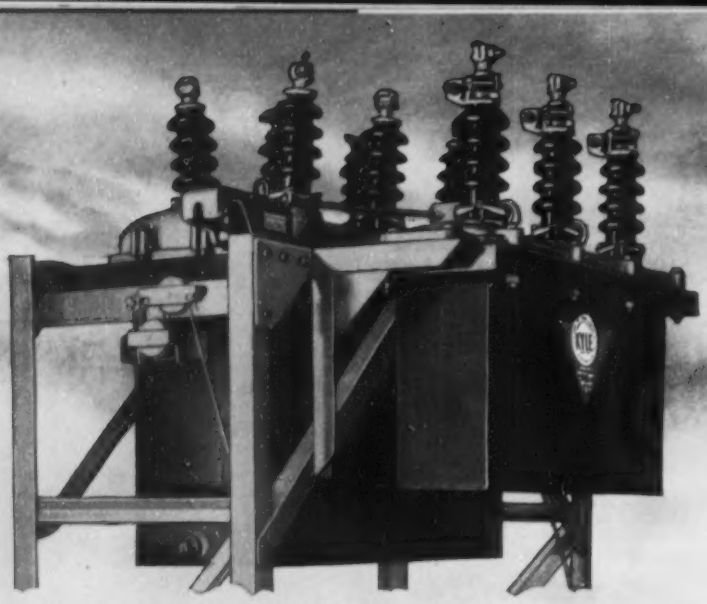
The Squeezon Tool with controlled hydraulic pressure cold welds the connector to the conductor—tool hangs easily to conductor fully supporting its weight.

For Better Construction . . .
Safer Maintenance

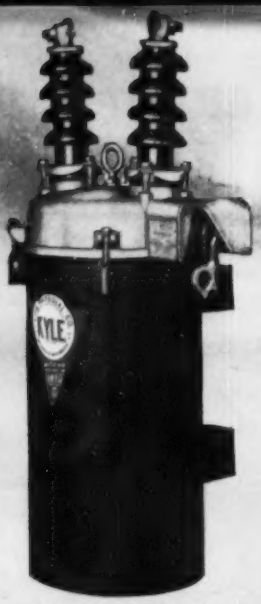
JAMES R. KEARNEY CORPORATION
4224-42 Clayton Avenue, St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

252

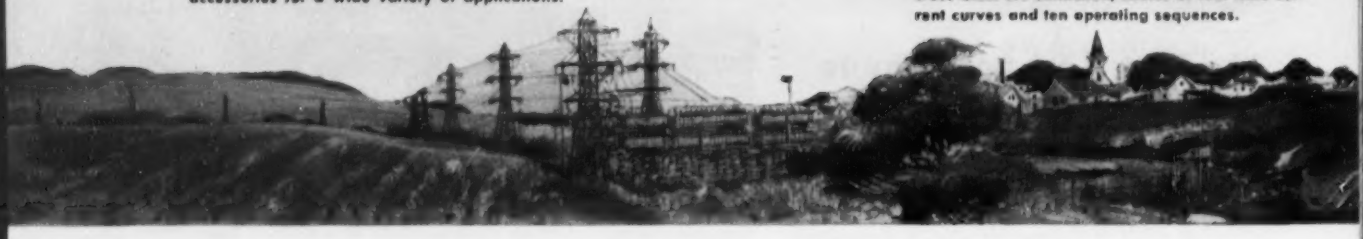
Specify
KEARNEY Products



Kyle Type R three-phase recloser; designed for substations up to 100,000 kva symmetrical fault current and heavily loaded feeders. Available with ground fault tripping and accessories for a wide variety of applications.



Kyle Type L single-phase heavy-duty recloser; provides interrupting capacities up to 6000 amperes at 4.8 kv, 4000 at 14.4. A big recloser with oil cross-blast arc extinction, choice of four time-current curves and ten operating sequences.



Complete Coordinated Automatic Protection from Substation to Load										
Distribution Class Nominal Rating 14.4 kv BIL 95 kv			Intermediate Duty Nominal Rating 23 kv BIL 150				Heavy-Duty Nominal Rating 14.4 kv BIL 110 kv			
Single-Phase Type H Three-Phase Type 3H			Single-Phase Type E Three-Phase +				Single-Phase Type L Three-Phase Type R			
Rating Amps.	Min. Trip Amps.	Inter. Rating* 14.4 kv	Rating Amps.	Min. Trip Amps.	Inter. Ratings* RMS Amperes 14.4 kv	23 kv	Rating Amps.	Min. Trip Amps.	Inter. Ratings* RMS Amperes 4.8 kv	14.4 kv
5	10	125	5	10	200	125	....	....	....	....
10	20	250	10	20	400	250	....	....	....	....
15	30	375	15	30	600	375	....	....	....	....
25	50	625	25	50	1000	625	25	50	1500	1500
35	70	875	35	70	1400	875	35	70	2100	2100
50	100	1250	50	100	2000	1250	50	100	3000	3000
....	....	....	70	140	2500	1750	70	140	4200	4000
....	....	....	100	200	2500	1750	100	200	6000	4000
....	....	....	....	....	....	....	140	280	6000	4000
....	....	....	....	....	....	....	#160	320	6000	4000
....	....	....	....	....	....	....	#185	370	6000	4000
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....	....	....	....	....	....	....	#225	450	6000	4000
....	....	....	....	....	....	....	#280	560	6000	4000

*Recloser interrupting ratings are based on the maximum test circuit X/R ratio of not less than 8, and the asymmetrical rating in total RMS amperes is 1.4 times the symmetrical ratings given in the table.

#Available in three-phase Type R only. **Available in single-phase Type L only.

+ Electrical interconnection available to give three-phase lockout.

For Ground Fault Tripping: Type R heavy-duty three-phase recloser is available with built-in ground trip solenoid and auxiliary current transformer. Type 3H is available with a shunt lockout coil which may be used for ground fault tripping with suitable auxiliary equipment.

Get the Facts on Complete Coordinated Automatic Protection

The L-M Field Engineer can help you with your protection problems. Discuss them with him—you'll find his advice helpful. Or write for information and bulletins. Kyle Products Division, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

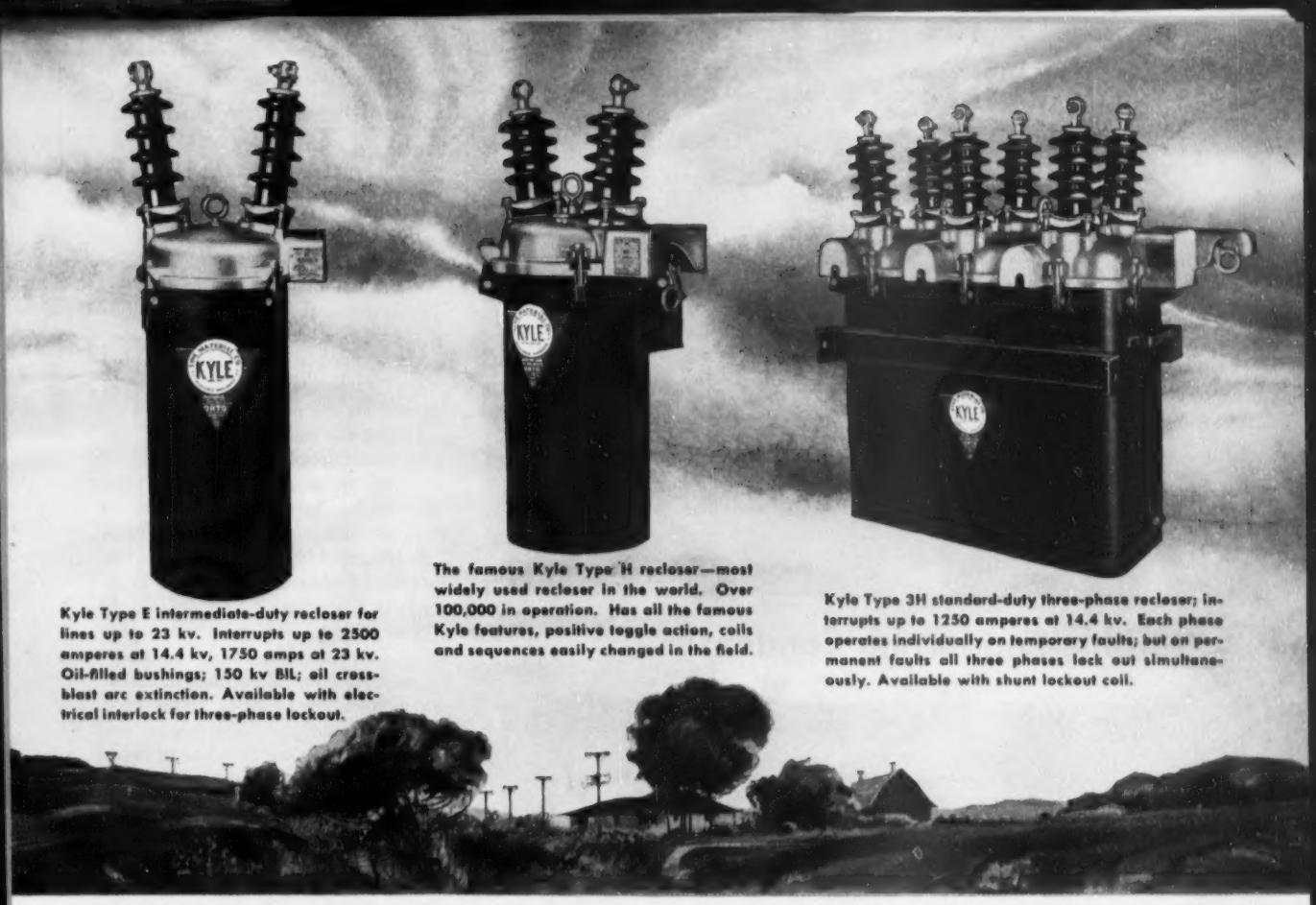
181

Compare What L-M Offers

Note the complete range of protection L-M offers in Kyle reclosers, compared with that offered by other companies.

SINGLE-PHASE						
Duty	L-M	Co. A	Co. B	Co. C	Co. D	Co. E
Light	yes	no	yes	yes	yes	no
Intermediate	yes	no	yes	yes	no	yes
Heavy	yes	no	no	no	no	no
23 kv	yes	no	no	no	no	no
Sectionalizer	yes	no	yes	no	yes	no

THREE-PHASE						
Light	yes	yes	no	yes	yes	no
Intermediate	yes	yes	yes	yes	no	no
Heavy	yes	no	no	no	no	no
23 kv	yes	no	no	no	no	no



Kyle Type E intermediate-duty recloser for lines up to 23 kv. Interrupts up to 2500 amperes at 14.4 kv, 1750 amps at 23 kv. Oil-filled bushings; 150 kv BIL; oil cross-blast arc extinction. Available with electrical interlock for three-phase lockout.

The famous Kyle Type H recloser—most widely used recloser in the world. Over 100,000 in operation. Has all the famous Kyle features, positive toggle action, coils and sequences easily changed in the field.

Kyle Type 3H standard-duty three-phase recloser; interrupts up to 1250 amperes at 14.4 kv. Each phase operates individually on temporary faults; but on permanent faults all three phases lock out simultaneously. Available with shunt lockout coil.

Only L-M Offers Complete Coordinated Protection from Substation to Load

by **R. C. KIRK**
Manager
Kyle Products Sales
Line Material Company

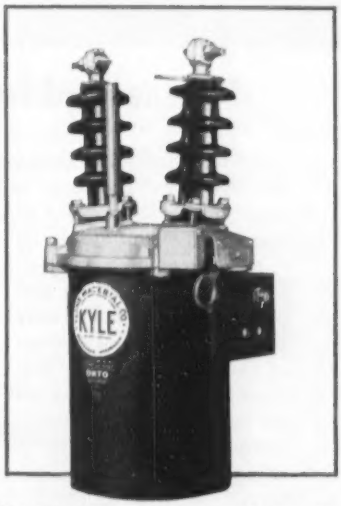
Utilities have done an outstanding job of rendering continuity of service to their customers, many times under extremely adverse conditions. But the growing cost of service continuity is a serious problem for the distribution engineer.

To help alleviate this problem, L-M makes available a complete, coordinated system of automatic protection. Reclosers are available that meet widely varying requirements, from those of a good-sized substation and heavily loaded feeders down to the smallest section. Automatic sectionalizers coordinated with the reclosers help eliminate faults, or will cut off one section without interrupting service on an entire area.

Complete automatic protection eliminates from 50 to 95% of the outages, utility experience shows. Service trips for replacing fuses are greatly reduced. Revenue is increased and costs can be cut appreciably.

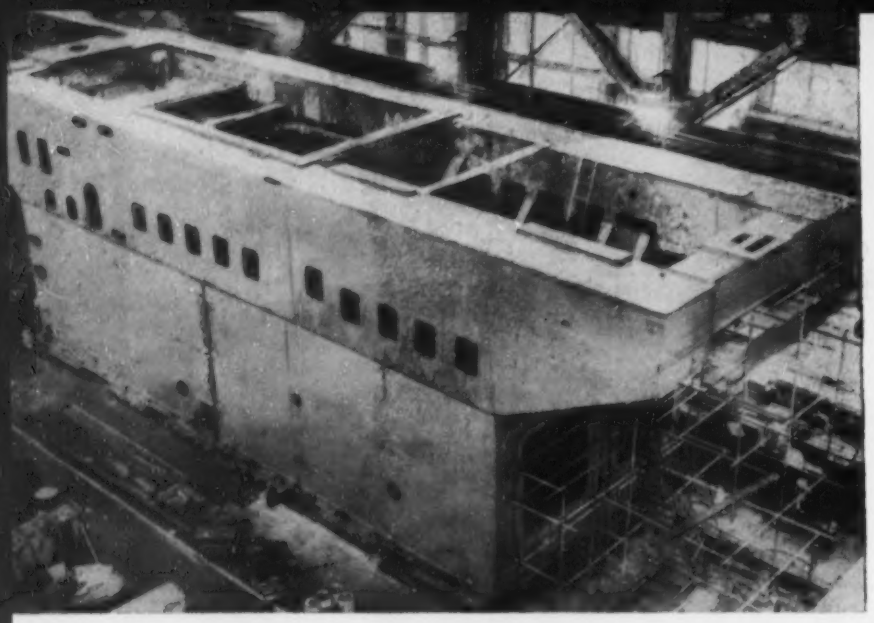
L-M was a leader in developing the completely automatic, dependable hydraulic timing system. L-M introduced dual timing in Kyle reclosers; L-M has pioneered in recloser development and has been the leader in the number of reclosers in use. Kyle reclosers offer the widest choice of time-current curves and operating sequences. And only L-M offers the fully coordinated series of reclosers and sectionalizers that permits complete automatic protection.

The design of Kyle reclosers and sectionalizers has been thoroughly tested and fully proved by extensive field experience. Because L-M makes more reclosers than any other company, L-M engineers have more experience, more data on which to provide Kyle Recloser Application Service. 181

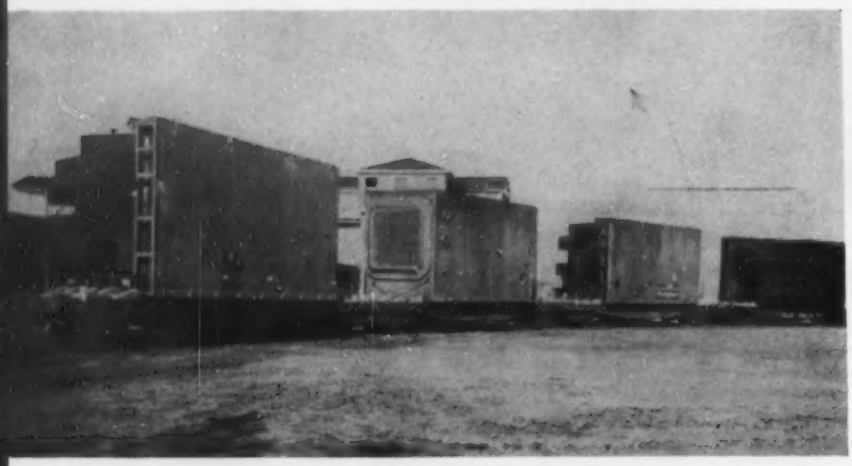


Kyle Type GS sectionalizer; coordinates with reclosers to clear temporary faults on branch lines. If faults are permanent, sectionalizer locks out, permits the recloser to restore service on other lines.

LINE MATERIAL Kyle® Reclosers



Turbine-Supporting Condenser . . .



. . . Disassembled for Rail Trip

Turbine-supporting condenser, reportedly the world's largest, was delivered recently by rail and barge to Jersey Central Power & Light Co. The 500-ton condenser is shown in top photo fully assembled at Westinghouse Electric Corp plant before its trip to the utility's Raritan River steam plant at Sayreville, N. J.

Because of its massive size, the condenser had to be disassembled for the journey. Four sections and the exhaust hood were shipped by rail (lower photo) from South Philadelphia to Sun Shipbuilding & Drydock Co, Chester, Pa., to be loaded on a barge for the ocean voyage. The barge trip was by way of Delaware River and Bay, around Cape May, north along the New Jersey coast line to Raritan Bay and River to the power station dock. Reassembly of the unit requires five weeks.

The condenser will mount a 137,500-kw turbine-generator. The turbine-supporting feature is a cost saving method in power plant construction. The condenser, which is 26 ft high, 80 ft long, and 23.5 ft wide at the turbine-generator base, requires 75,400 gallons of water per minute to condense about 567,000 lb per hr of steam.

The $25-million addition to Raritan station is about 65% completed. It will be ready for operation early in 1955 and will bring Jersey Central P&L's capacity to 379,000 kw.

Columbia Power Body Backed by PUD Group

The Washington PUD Association has endorsed recent action of the Northwest Public Power Association calling for a regional Columbia River Power Commission and offered alternate plans as to how such a commission could be formed.

Under one plan, the President would name five members, with no more than three from one political party.

Under the second plan, the President would appoint only one member, with the states of Washington, Oregon, Idaho, and Montana each to elect one more on a non-partisan basis for staggered five-year terms. The proposed commission would be chartered by Congress.

The federal government would give its existing power assets to the commission, which would assume the present debt of the facilities, about 75% of the original cost, and finance extensions through the issuance of revenue bonds.

The government has spent about $1.3 billion for dams, power plants and transmission lines in the area, including projects not yet in the production stage and including expenditures chargeable to navigation and flood control.

Future dams would continue to be built by the Army Corps Engineers and the Bureau of Reclamation. These two agencies would bear the expense of irrigation, flood control, and navigation.

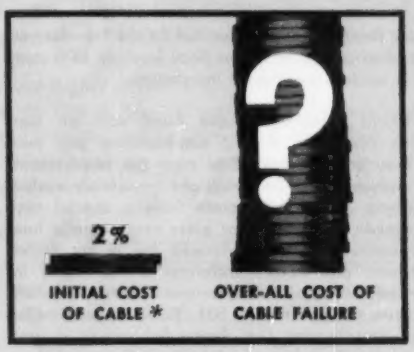
The PUD association is convinced, said President Dan Jolly of Franklin County, that a federally chartered regional commission offers the only workable solution to the area's power problem. Experience of Colorado River states indicates that the proposed "interstate compact" plan is impractical, said Jolly.

New California Power Unit

Representatives of farm, labor, and business interests of northern California met last month at Sacramento to form California Water and Power Users Association. Aim of the new group was announced as promotion of full development and distribution of California's water and power resources.

RoZone is approved and accepted by leading utilities, industrials and consulting engineers. 5-conductor control cable RoZone insulated, Neoprene sheathed. Outer sheath of RoPrene (Neoprene)—600V.

Look at Cable Cost both ways



You can look at the cost of cables for generating stations two ways.

One is the initial cost of the cable in relation to the over-all cost of the station. The other is initial cable cost related to the cost of cable failure. In both respects, the initial cost of the cable is practically negligible.

Both add up to the same thing. You can't afford to sacrifice quality for price. It truly costs less to buy the best.

That's why so many utilities specify Rome RoZone insulated cable for primaries up to 15 KV, for station control cable, for street lighting, for distribution and many other requirements.

This premium quality, ozone-resistant oil base type insulation exceeds all requirements of ASTM specification D-574 and offers these basic advantages:

1. High resistance to aging. Longevity of original characteristics.
2. On the basis of long-time test, dielectric strength exceeding 400 volts per mil. Surge or impulse strength proportionately high.
3. Utmost resistance to corona and ozone cutting.
4. Low dielectric loss.
5. Exceptional electrical stability in water.

The Rome Power and Control Cable Catalog contains complete information on Rome RoZone. Send for your copy today!

It Costs Less to Buy the Best

* AVERAGE INVESTMENT IN WIRING IN STEAM GENERATING STATIONS 1.9% of station investment, excluding land. $2.75 per KW of nameplate capacity. (Source: "Continuing Property Records for Station Piping, Wiring and Conduit.")

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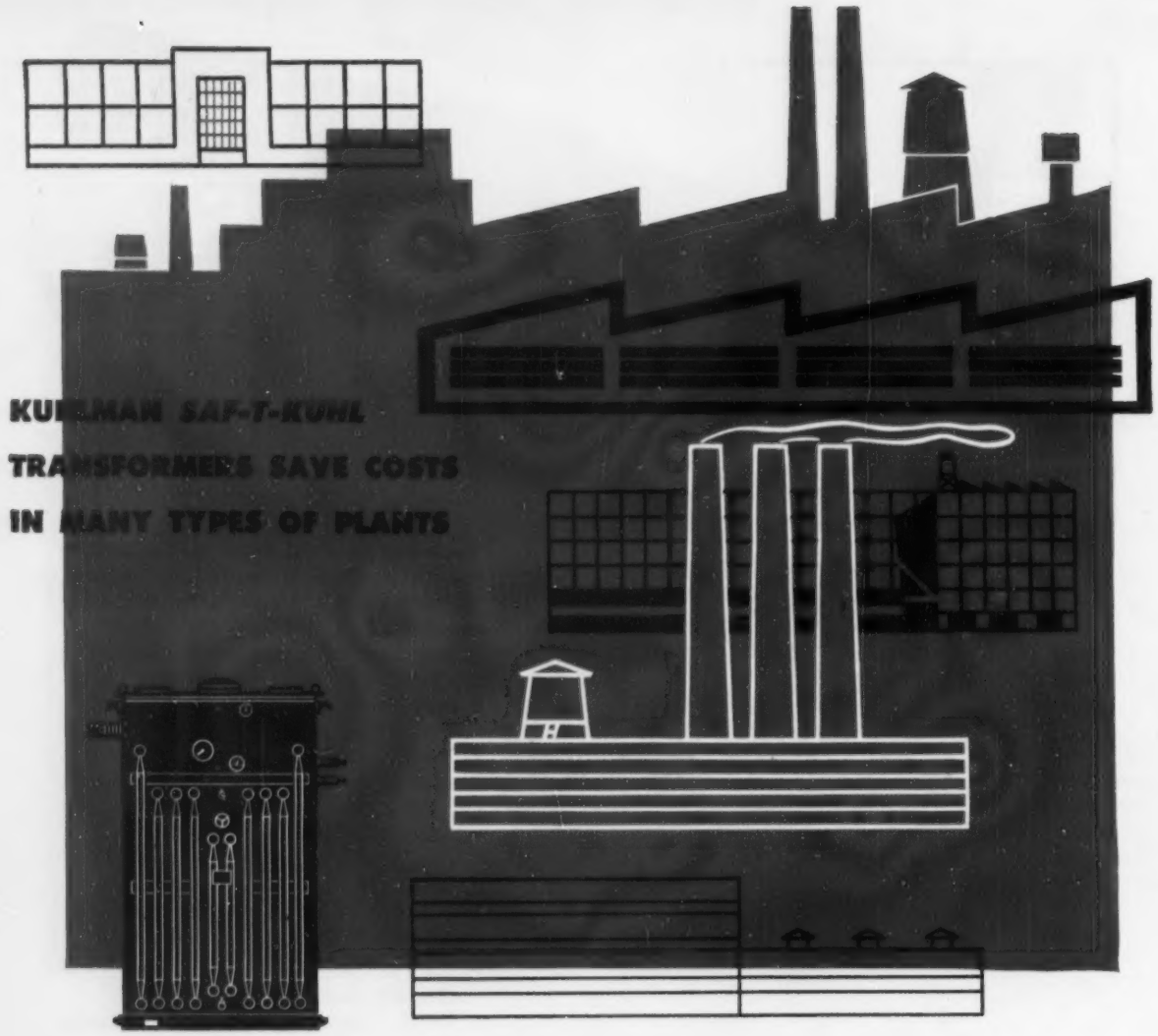
ROME CABLE ROME, N.Y.



KUHLMAN *SAF-T-KUHL* TRANSFORMERS SAVE COSTS IN MANY TYPES OF PLANTS

The advantages of Kuhlman Saf-T-Kuhl Transformers, employing a fireproof coolant, are well known.

- You save installation time and costs because Saf-T-Kuhl Transformers do not require expensive fireproof vaults.
- You save on materials because electrical circuits can be divided into several sections with a transformer at the center of each section. The expense of running long and large copper conductors as secondary lines is eliminated and better voltage regulation and reduced energy losses result.
- You save on maintenance costs because the cooling fluid in Saf-T-Kuhl Transformers never has to be filtered or reconditioned—it will not sludge.
- You save on insurance rates in most states because Saf-T-Kuhl Transformers are absolutely safe and fireproof.
- You save on floor space because Saf-T-Kuhl Transformers can be installed above or below floor level or as a component of a modern switchgear installation.

Kuhlman Saf-T-Kuhl Transformers are filled with an inert synthetic cooling compound that is non-explosive and non-inflammable. They are engineered to meet the requirements of heavy duty industrial service. Tanks are completely sealed. Cover and bushing gaskets are made from a special cork and synthetic rubber compound that gives exceptionally long life. Assembly operations are performed by highly skilled electrical craftsmen, and each transformer is thoroughly inspected and tested. For complete information about Saf-T-Kuhl Transformers, write for Bulletin CS 501. Kuhlman also manufactures Power, Distribution, Dry Type, Subway, CSP and Series Street Lighting Transformers. Ask for bulletins on these units as well.

154-M

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 90 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

ENGINEERING MEETING

EEI Engineering Committees Study Growth Problems

Problems created by rapid load growth on today's utility systems were reflected in discussions of all the engineering committees of the Edison Electric Institute meeting at Chicago, May 3-5.

Need for higher voltages—both for primary and secondary distribution—dominated the deliberations of the Transmission and Distribution Committee and carried over into Meter and Service Committee discussion of meter obsolescence. In the Electrical Equipment Committee problems of growth were aired in discussions of system planning and power station and substation design while the Hydraulic Power Committee focused on structural, control, and operation problems of modern installations.

Compare Merits of 12 and 4 kv . . . There was substantial agreement on the merits of higher primary voltages among contributors to a symposium on the subject.

W. R. Bullard, Ebasco, said introduction of a higher voltage into a 4-kv system need not involve loss of 4-kv investment. Higher voltage may be used in new load areas and introduced into old areas as needed.

A. J. Pansini said Long Island Lighting has deliberately "overextended" 13.2-kv primary lines beyond 100 circuit miles to carry new loads for short periods under unusual conditions. Higher load factors have resulted from the greater area coverage with 13.2 kv because such feeders serve 2 to 2½ times as many customers as 4 kv and loads are more highly diversified.

Pacific Gas & Electric serves all new subdivisions at 12 kv, and confines 4-v to areas long-established, Clive Baugh said. Significant savings inherent in higher voltage distribution are almost entirely in transformer stations and subtransmission circuits.

W. R. Doar, Carolina Power & Light Co, said a single 23-kv distribution circuit will carry as much load as six 4-kv circuits or two 12-kv, at lower losses and less voltage drop. The overall difference in cost of converting 4 to 12 kv as compared with 23 kv will be usually less than 10%.

Frank Sanford, Commonwealth Services, speaking for 4 kv, said that it remains the predominant load carrying voltage. Comparison of 4 and 12 kv boils down to one of economy in subtransmission and substation locations.

Opinions of panelists on the trend to higher secondary voltages ranged widely at a session shared by the T&D and Meter Committees. Concensus seemed to be that 277/480 v is best for spot networks serving major commercial and industrial installations. Proponents of 240/480 v drew opposition from those who saw appliance voltages a problem. Others urged wider use of 240-v circuits in buildings.

HYDRAULIC POWER CHAIRMAN P. M. Hess, Pennsylvania Water & Power, confers with E. M. Fucik, Harza Engineering; W. J. Rheingans, Allis Chalmers; and R. H. Pepper, Newport News Ship Building

TRANSMISSION AND DISTRIBUTION committee conferees are C. E. Baugh, Pacific Gas & Electric; W. R. Doar, Carolina Power & Light; A. J. Pansini, Long Island Lighting; Chairman J. W. Anderson, Philadelphia Electric; and W. R. Bullard, Ebasco

H. E. Yeide, Potomac Electric Power Co, warned that in an area already covered by a 208-v network, higher voltages will produce higher costs and more complex problems. But where a large installation is to be supplied by a spot network, cost differences will be minor if 277/480 v service is supplied instead of 120/208 v.

Commonwealth Edison today has 58 1,000-kva, 3-phase, network-type transformers in 16 277/480-v spot network vaults and five more in industrial vaults, according to F. A. Cox. He felt that secondary distribution systems higher than 120/240 and 120/208 will find increasing favor but that 3-wire, 120/240 v has been adequate for residential loads in Chicago's more concentrated load areas.

A. J. Pansini, Long Island Lighting, while favoring single-phase for residential areas, said that 120/240 v becomes inadequate at about the 5-hp limit in large developments; and other means must be resorted to above this value. Although he felt the cost plus the demand and energy losses of dry type autotransformers would reduce

A. M. deBELLIS, Consolidated Edison, chairman of Electrical Equipment Committee, pounds gavel calling meeting to order

or cancel any savings in making a transition from 120/240 to 240/480 v, Pansini said such transformers should be considered only an interim solution.

In a paper read by H. E. Campbell, D. K. Blake, General Electric Co, said that although the industry can save money in the 240/480-v secondary, it does not appear that this saving can be realized if it is necessary to make a system transition or spend money on the consumers premises for auto-transformers to supply 120-v appliances. This, he said, leaves one hope for 240/480 v, and that is an industry wide saving in the consumer's premises at 480 v so the consumer can pay for the auto-transformer.

W. R. Bullard, Ebasco, saw no major problem in securing 240-v appliances as a variety of types are currently available. When economic potentialities are fully realized, he foresaw a strong trend to 240/480 v. Meanwhile he suggested that wiring bottlenecks in existing buildings could be solved by connecting more appliances across outside legs of existing 120/240 v, 3-wire systems. Auto-transformers are not vital to orderly transition nor the shift being made all at once. E. V. Sayles, Consumers Power, urged use of 240 v already available in homes. He also favors 277/480 over 240/417 and 480 v ungrounded.

H. G. Barnett, Westinghouse Electric, presented a graphical comparison of voltage spreads in 120/208-v wye, 250/433-v wye, and 277/480-v wye systems and ranges of tolerable voltage for utilization equipment.

Slides prepared by E. V. Sayles, Consumers Power Co, showed the difference in flicker voltages of equivalent motor sizes at 240 vs 120 v.

Preliminary returns of a questionnaire seeking to establish industry preference regarding taps on distribution transformers of different size and voltage rating were reported by E. V. Sayles, chairman of the EEI-NEMA Joint Committee on Standards for Distribution Transformers.

C. E. Betzer, Commonwealth Edison, concluded from 30 years experience with reduced insulation thickness of solid-type, paper-insulated cable on Chicago's system that present recommended thicknesses are adequate.

Metermen Study Obsolescence . . . Obsolescence, methods of meter testing, and problems of metering rapidly growing and new types of loads, particularly air conditioning, were among the main topics of discussion in the joint meeting of the EEI and AEIC Meter and Service Committees.

Exact determination of economic obsolescence of meters is a difficult but pressing problem, A. W. Rauth, Consumers Power, said in his paper. Metermen from several companies reported attempts to justify replacement of 5-amp, Type OA meters on the basis of monthly kwhr use, but no clear-cut answer emerged. E. L. Keller, Duquesne Light Co, reported finding OA meters that showed good accuracy on test but on close inspection showed insulation to be burned from current coils. Duquesne is spending $1 million a year to replace these meters.

F. A. Redding, Southern California Edison Co, said satisfactory starting watts and acceptable light load accuracies are the only things standing in the way of meters of 200-amp capability.

Shop, mobile lab, and field testing of meters were discussed by J. A. Morris, American Gas & Electric Co. The AGE system has had 18 years experience with the mobile laboratories. Cost-wise they brought a 30% improvement.

G. J. Yanda, Cleveland EI, said that in view of problems of metering low-power factor, low-diversity loads and their rapid development, many utilities will want to re-examine their metering practices.

H. A. Brown, Rochester Gas & Electric Corp, in his paper on service drops and meters concluded that the minimum service installed today should be 100 amp, 3 wire, 120/240 v, and it should be metered with a 15-amp meter.

H. I. Miller, manager of rates and research, Wisconsin Public Service Co, observed that with many utilities planning demand rates to cope with the economic problem of serving growing residential load, there is need for industry standardization on a single demand interval.

System Planning Accented . . . In the Electrical Equipment Committee meeting problems of system planning, relay protection, and substation design were discussed.

G. F. Switzer said plans of Indianapolis Power & Light Co include progressive conversion of distribution to 12 kv. Higher transmission voltages, probably 230 kv, will be used as compared to 138 kv.

Five types of high tension substation designs were described by Walter Morton, Pennsylvania Power & Light Co. One feature of the large substations was the use of steel for the grounding system, eliminating corrosion.

Aluminum substation bus designs were described by J. J. Ray, Philadelphia Electric Co. Tubing was used for rigid-type bus, and sections of bus were welded together.

Fly Ash Improves Concrete . . . A wide variety of problems and new developments in the field of hydraulic power were discussed by the Hydraulic Committee.

E. M. Fucik, Harza Engineering, said that although fly ash, delivered to a project in Central America, cost more than cement, they felt fully justified in its use. Reduced temperature rise and resulting freedom from cracking, increased workability, slower initial set, and insurance against harmful alkali reactivity were advantages listed.

A. C. Werden, Southern California Edison, described efforts at cloud seeding and various ways of artificially causing precipitation for power system purposes, irrigation, farming, and other purposes.

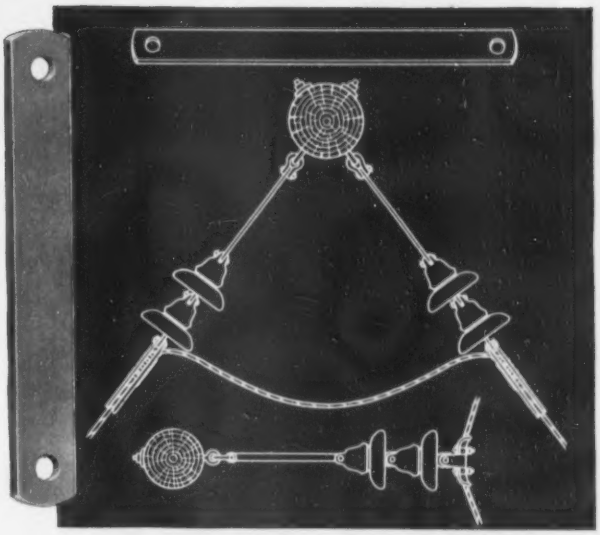
Research on problems in Francis turbine wheel vibration was described by R. H. Pepper, Newport News Ship Building & Dry Dock Co. Final conclusions have not been reached, but it appears that semi-circular notches in the trailing edges of the blades may be the answer.

LINE CONSTRUCTION BLUEPRINTS

HOW SOME UTILITIES ARE MAKING CONSTRUCTION WORK EASIER . . .
IN WAYS THAT MAY BE HELPFUL AND USEFUL TO YOU.

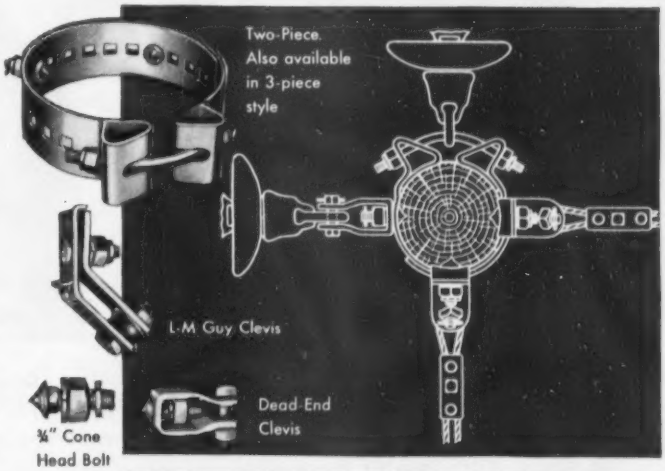
L-M EXTENSION LINKS

For safety reasons, more and more extension links are being used to obtain greater clearance from pole or crossarm to the insulators at primary dead ends. The links are attached to the wood member with an eye bolt and shackle. L-M extension links are available in a wide variety of sizes to meet any desired application.



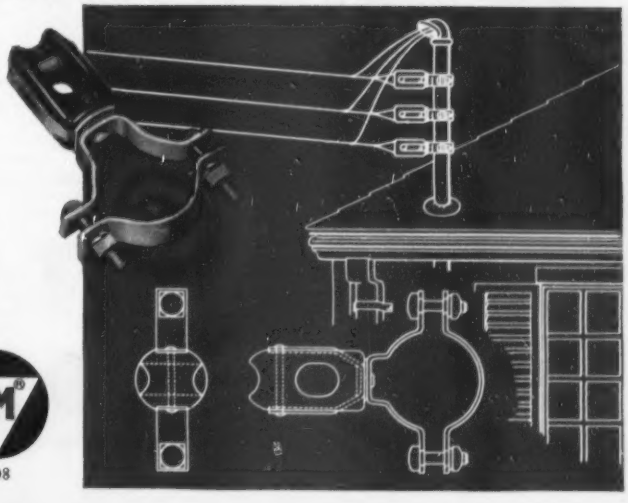
L-M POLE BAND and ATTACHMENTS

An improved galvanized steel (3/16" x 3") pole band for guying and dead ending. One of the advantages of this style band is that dead ends and guys may be attached at many different angles. Even under extreme load its strength does not depend on the strength of the welds. Two sizes, adjustable for 6 to 10 inch poles, and 8 to 15 inch poles. Choice of fittings. The ¾ inch curved bolt also can be used for attaching dead end fittings.



HANDY SERVICE ENTRANCE BRACKET FOR LOW-ROOF RANCH HOUSES

To assure required clearance for service drop wires on low ranch houses, the service entrance conduit frequently extends above the eaves of the roof. When 2" or 2½" conduit is used as a mast in this type of installation, this bracket provides a sturdy yet inexpensive method for dead ending the service drops. Catalog Number BPA43E1.



Do you have a line construction problem? These are just a few of thousands of L-M line construction specialties. If you have a line construction problem, let us know. We may have standard or special items in stock that will solve it. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

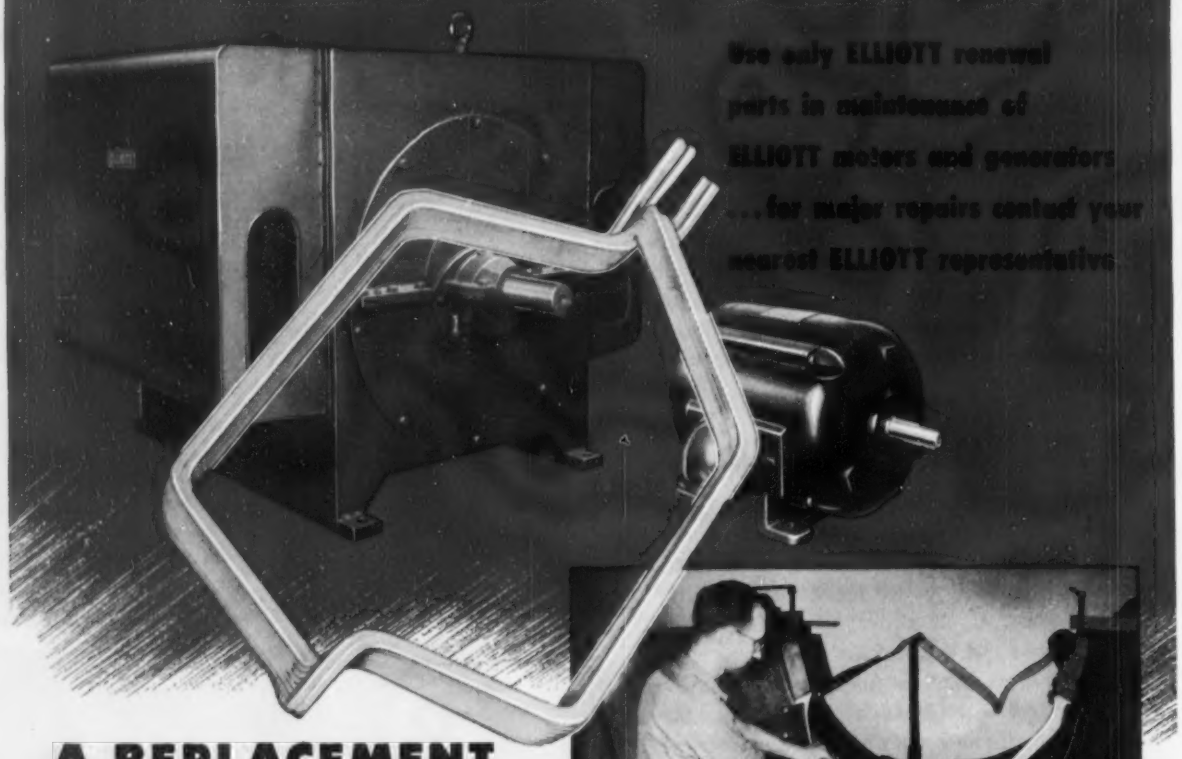
LINE MATERIAL

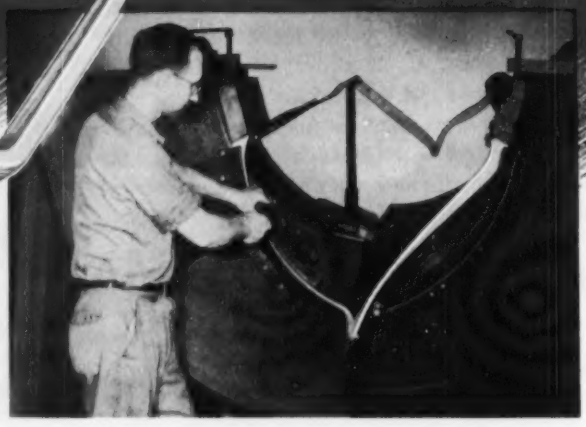
Line Construction Materials

Complete Coordinated Equipment for Distribution Today

PLAY IT SAFE!

Use only ELLIOTT renewal parts in maintenance of ELLIOTT motors and generators ...for major repairs contact your nearest ELLIOTT representative





A REPLACEMENT COIL THAT'S A TRUE DUPLICATE

of the original coil is the only assurance of continued high performance. The special form in the photo above produces coils absolutely uniform in shape. Only one of these coils can correctly replace another coil from the same machine.

ELLIOTT ROTOR COILS ARE BAKED UNDER PRESSURE for homogeneous structure and close tolerance, and are properly treated at several points of manufacture with best grade insulating varnishes.

ONLY THE BEST AVAILABLE INSULATING MATERIALS, proven so in constant test, are used in Elliott coils. Insulation practice is considerably beyond standard practice for the voltage of the machine, insuring longer life, highest performance.

FOR BEST RESULTS have coils installed by Elliott factories or Elliott approved service shops. Ask your local Elliott field engineer for location of the shop best suited to serve you.

ELLIOTT Company

Q4-2

TURBINE-GENERATORS TURBINES MOTORS GENERATORS DEAERATING HEATERS EJECTORS CONDENSERS COMPRESSORS TURBOCHARGERS TUBE CLEANERS STRAINERS

480Y/277 v System Savings

Lower costs cited on commercial building installations in reports presented at AIEE district meeting

Detailed economic substantiation of the trend toward 480Y/277 v systems for commercial buildings was contributed at the American Institute of Electrical Engineers Northeastern District meeting held in Schenectady, May 5-7.

Thorough study of the 500-kw load for a New York Telephone Co building in Albany resulted in costs of $228,000 for the 480/277 v system, $242,000 for the 208/120 v with 24 v switching, and $262,000 for the 208/120 v system with 120 v switching. The authors, H. J. Donnelly, New York Telephone and D. S. Brereton, General Electric Co, pointed out that these values represented savings of $23.50 per kva and $32 per kva respectively of the 480/277 v system relative to the other two.

Comparable Savings . . . The "factory of the future" of the Norton Grinding plant at Worcester encountered comparable savings of $12 per kva of the 480Y/277 vs the 480/208/120 and $14.70 per kva vs the 208/120 according to Paul Russell of GE's Boston office.

Improved technique for preheating alternator fields, economy in repetitive units for power plants and significance of voltage unbalance in delta secondaries were other key themes developed at the Schenectady AIEE sessions.

Preheating Alternator Fields . . . New factors involved in the distortion and differential expansion of alternators were brought out by W. J. Gilson and H. D. Taylor, General Electric. During a normal start a 200-in. field coil may expand ⅛ in. more than the rotor core. Centrifugal forces are restrained and therefore add to the longitudinal expansion. Aluminum alloy has been developed to have a yield strength comparable to silver-bearing copper and is reportedly giving superior performance at the end turns. The authors recommended establishing a differential expansion between field coil and slot wedge before bringing the generator to rated speed. This reduces wear and tear on the insulation. However the preheating should not be done at standstill lest the collector rings be damaged.

In discussion, J. G. Noest said Consolidated Edison Co couples the field preheating with the Falkner quick-start technique and gets good composite results by "bottling up" the generator for short shutdowns so as to hold the temperatures for the restarting.

Niagara Mohawk Power Corp's new Albany generating station appears to be unique in that it has four identical 80/102-Mw units installed in the 1952-54 period. The avoidance of repeated engineering and drafting made quite a saving in dollars, according to J. M. Geiger, chief electrical engineer, but, more important it eased the burden of establishing an additional 770 Mw at other points on the system during the 1948-54 period.

Voltage Unbalance . . . Voltage is almost certain to be unbalanced on delta secondaries serving both single-phase and three-phase loads and A. S. Anderson and R. C. Ruete, Ebasco Services, Inc, derived the equations for these conditions. One of their aims was stated to be toward acceptance by manufacturers and utilities of a reasonable degree of such unbalance. In the absence of a definition of unbalance they suggested use of the ratio of negative to positive sequence voltages as the index.

That a nuclear reactor constructed for power purposes is physically incapable of a violent explosion was the assurance given by J. I. Owens and J. H. Pigott, General Electric. But there are risks that there may be disintegration of the reactor core and dispersal of high radioactive fisson fragments over the countryside unless adequate precautions are taken, they said. Shields and enclosures, therefore, have to be supplemented with failure-proof controls particularly the provision of safeties to decrease radioactivity rapidly in case of an impending accident. Since it is unsafe to increase the activity at the same rapid rate the result is that misbehavior of a reactor may mean some time will elapse before steam generation can be resumed. Actually ,however, the authors felt that reactor power plants can be designed and operated to present no more danger to operating personnel than conventional plants.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING MARCH

State	Utility	Plant	Fuel	Capacity (Kw)
Conn.	Connecticut Light & Power	Danielson	S*	6,000
N. Y.	Consolidated Edison Co	Astoria	S	180,000
Pa.	Pennsylvania Electric	Shawville	S	125,000
Mich.	Bessemer Light Utility	Bessemer	IC	1,136
Iowa	Iowa Power & Light	Des Moines	S	66,000
S. D.	Municipal Electric Department	Wessington Springs	IC	429
N. C.	Nantahala Power & Light	Bear Creek	H	9,000
Okla.	Public Service of Oklahoma	Southwestern	S	80,294
Mont.	Bureau of Reclamation	Canyon Ferry	H	16,666
N. M.	Lea County Electric Cooperative	Lovington	IC	2,250

PLANT RETIREMENTS DURING MARCH

Me.	Casco Bay Light & Power	Peak Island	IC	300
Kan.	Johnson Municipal Power Plant	Johnson	IC	80
Tex.	Texas Power & Light	Gainesville	IC	500

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of April 1—Hydro, 22,376,960 kw; Internal Combustion, 2,229,918 kw; Steam, 68,383,533 kw; Total, 92,990,411 kw.

*Gas Turbine

CORONA *free* DESIGN

Stretches

HERE'S A TRANSFORMER THAT WILL STAY YOUNG

CORONA AGES TRANSFORMERS prematurely, produces local heat and chars insulation. Eventually insulation becomes a conductor, causing transformer failure.

Corona-free design of Allis-Chalmers power transformers means that corona will never cut into this transformer's life. The harmful effect of corona will never reduce return from this transformer investment.

Economical FORCED OIL COOLING

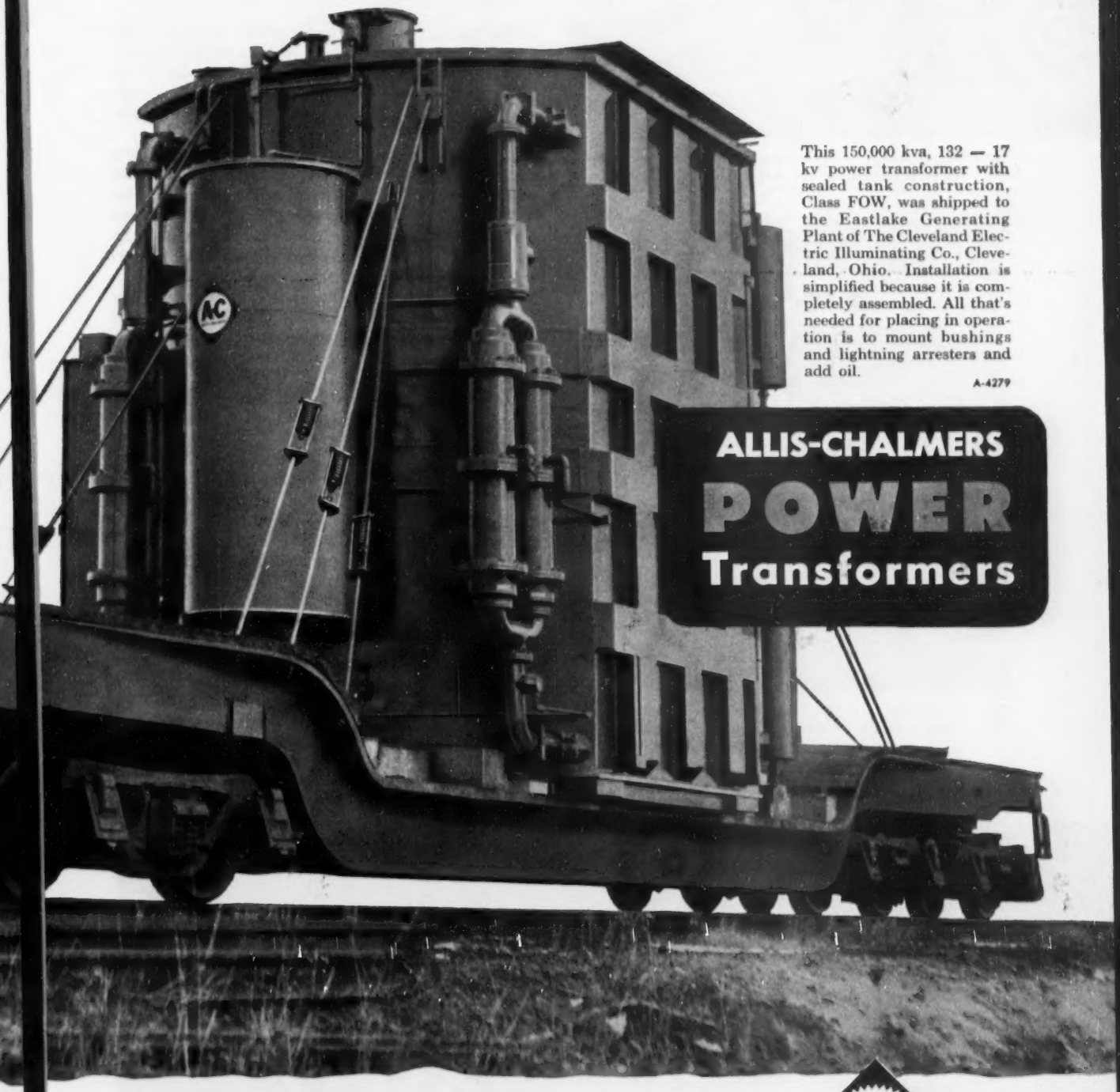
In this transformer, two *Electro-Cooler* units (visible on left side of transformer) remove warm oil from the top of the transformer tank, circulate it through water-cooled heat exchangers, and return it to the lower portion of the tank. Forced oil cooling of power transformers was first made economical by Allis-Chalmers development of the *Electro-Cooler*.

The *Electro-Cooler* is an entirely self-contained, self-supporting, and self-lubricated oil-immersed motor and pump on a single shaft. It is totally enclosed in a single casing and sealed. Two ball bearings support both pump and motor. There are no glands, stuffing boxes, or oil leaks. The three-phase squirrel-cage motor has no starting brushes, no commutator, or other wearing parts.

Electro-Cooler is an Allis-Chalmers trademark.

ALLIS-

Investment Dollars



This 150,000 kva, 132 — 17 kv power transformer with sealed tank construction, Class FOW, was shipped to the Eastlake Generating Plant of The Cleveland Electric Illuminating Co., Cleveland, Ohio. Installation is simplified because it is completely assembled. All that's needed for placing in operation is to mount bushings and lightning arresters and add oil.

A-4279

ALLIS-CHALMERS
POWER
Transformers

CHALMERS

A-C ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN

New Plant Will Clean 'River Coal'

1 Biggest dredge on Susquehanna above tidewater sucks up 420 cu yd of material an hour and delivers it to 800-ton barges

2 At unloader crane lifts 500 tons of material per hour from barges to hopper. Material is then pumped to washery on hill

Coal "mining," handling, and washing facilities of Pennsylvania Water & Power Co are being modernized to provide fuel for the company's expanded Holtwood Plant. This plant is a combined installation (104,000 kw, hydro; 30,000 kw, steam). The new 66,000-kw unit will go into operation this summer.

The coal will be prepared near the Safe Harbor hydro plant, 8 miles north on the Susquehanna River. The coal (anthracite) will be dredged from the lake formed behind the Safe Harbor dam. Over 500,000 tons a year must be secured during the nine months weather permits dredging. For this work the company has secured a $500,000 dredge, four 800-ton steel barges, and a new tugboat.

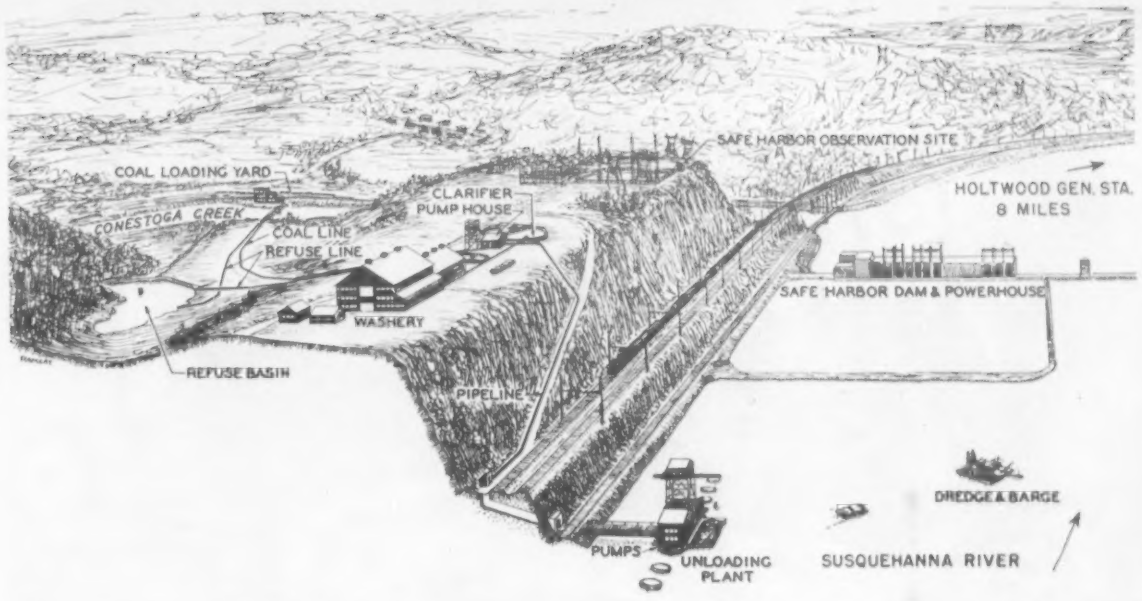
The material taken from the river is roughly half tiny particles of anthracite and half silt. To prepare this coal for use the company has erected a recovery plant at Safe Harbor to handle about 2,400 tons every 24 hours.

Coal Washing Process . . . The dredgings from the river are unloaded at Safe Harbor into a hopper on the river bank. From there the material is pumped about 275 ft above the river bank to the coal recovery plant. Here the initial operation separates most of the slimes from the coal. The coal-refuse goes to sizing screens which separate the coarse from the fine at 35 mesh. The larger particles, about the size of ground coffee, are carried to shaking tables, similar to those used in mining industries, where the final coal-refuse separation is made.

Smaller sizes flow to vat-like conditioners containing a mixture of water, fuel, and pine oil. From the conditioners the coal is carried to flotation cells. The coal particles cling to the oil and stay on the surface. The refuse drops to the bottom. Revolving paddles scrape it into troughs from where it is returned to the larger sizes.

Recovered coal is then pumped to a dewatering plant

3 Coal washing process starts at deslimer (small circular pool) where most refuse is removed. Cleaned coal is then pumped to washing plant where coal sizes are separated and all refuse removed. Clarifier (large pool) separates water from silt

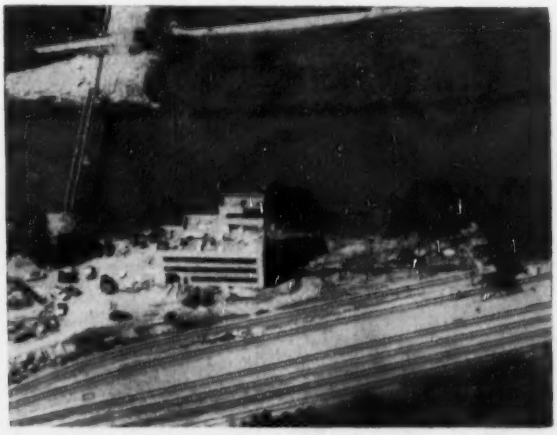


"RIVER COAL" RECOVERY PLANT at Safe Harbor gets dredged coal-laden material from barges. Material is pumped to washery on hill from unloading plant. Coal and silt are separated. Clean coal goes to car loading yard for shipment to Holtwood. Refuse goes to basin

alongside a railroad siding. The refuse is piped to a special basin so that it will not get back into the river. The refuse basin is an area between nearby hills.

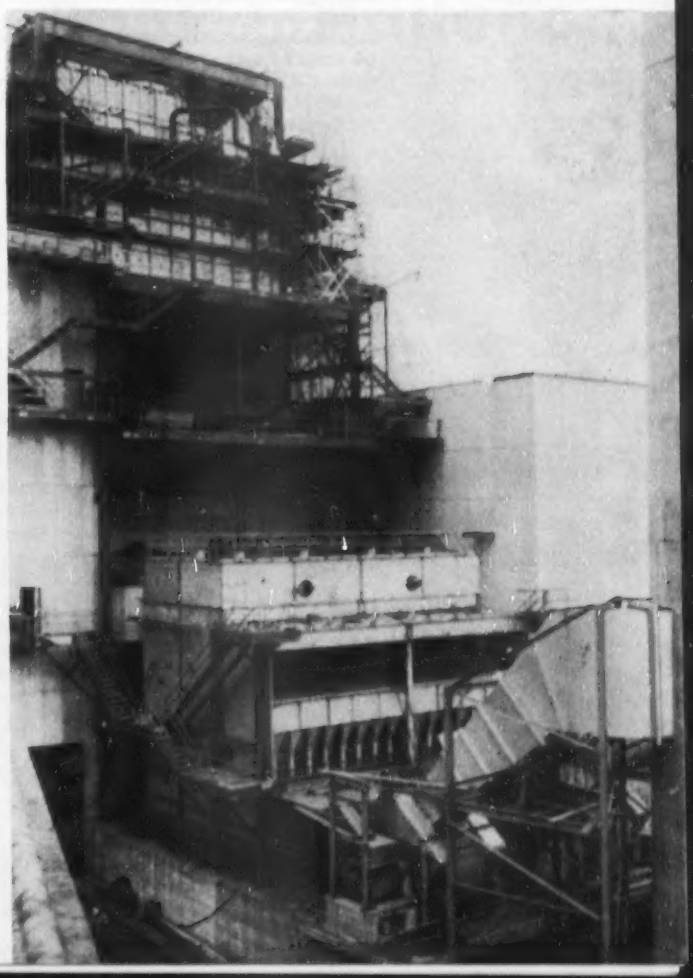
The dewatered coal is carried by conveyor belt to hopper cars for transportation to the Holtwood Plant There the coal can go directly to the pulverizers or to the 200,000-ton storage yard.

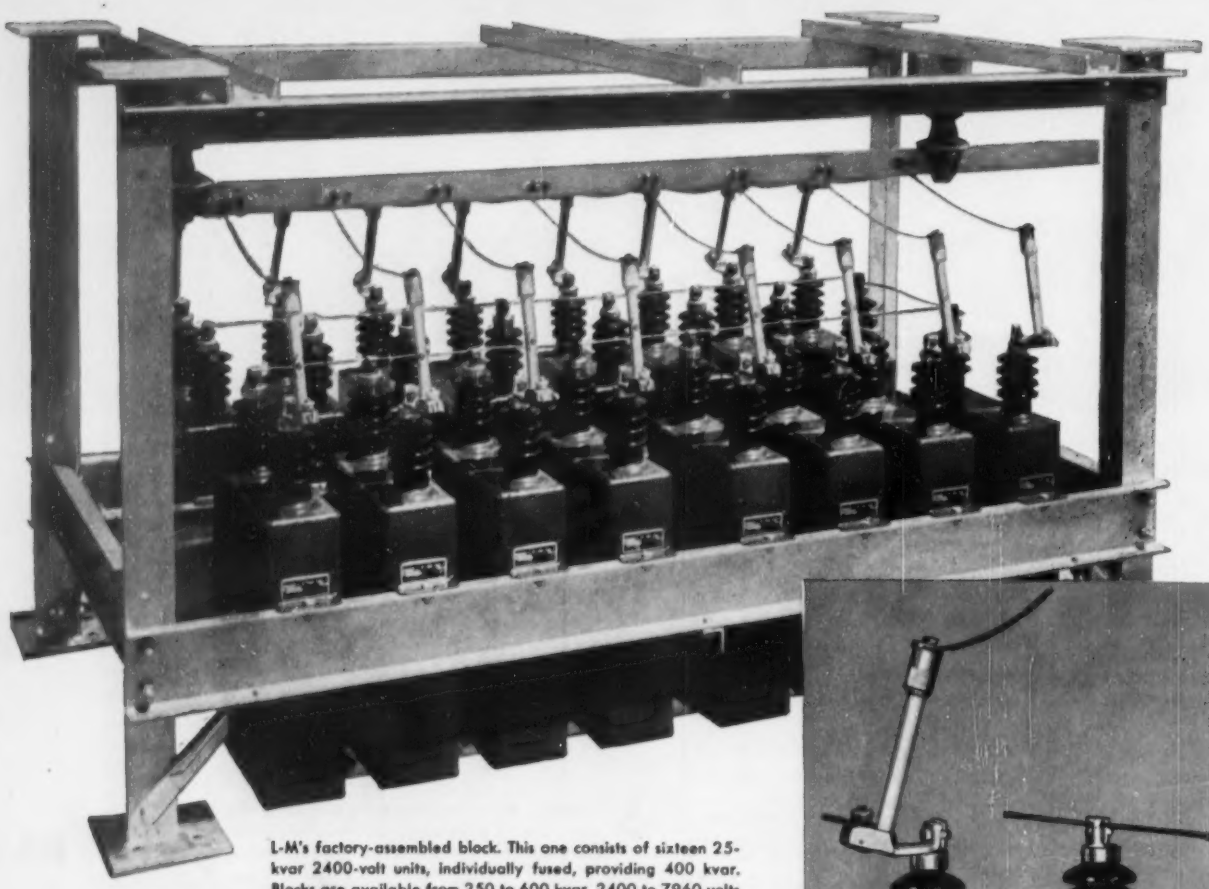
Holtwood's new boiler is rated at 700,000 lb of steam per hr, 945, psig, 905 F and is reported to be the world's largest anthracite coal-fired boiler. It will have a furnace about 40 by 37 ft, and 125 ft high, with a total volume of 96,000 cu ft. It will burn more than 46 tons of river coal an hour.



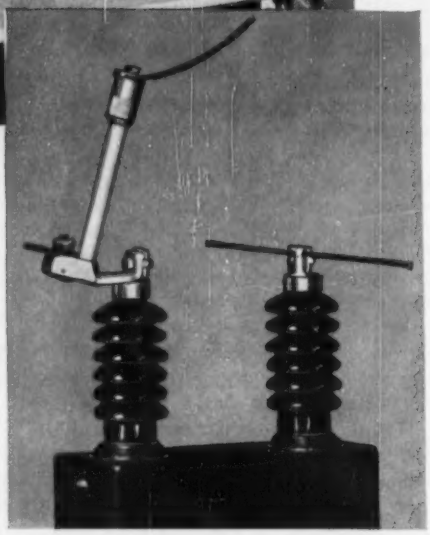
4 Coal from washery is piped to centrifuge plant for dewatering. Conveyor to the right carries it to the hopper for loading in cars of the Pennsylvania RR which carry it to Holtwood Plant

5 **LARGEST ANTHRACITE-FIRED BOILER** in the world at Holtwood Plant, 8 miles away, will consume coal at rate of 46 tons per hour. The new 66,000 kw turbo-generator will use steam

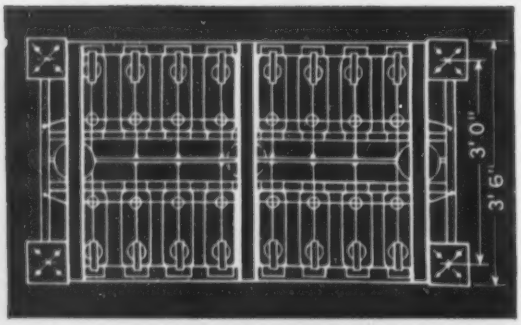


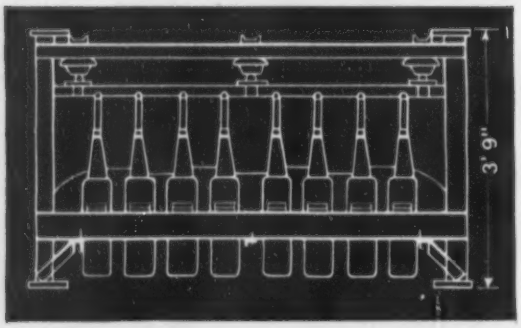


L-M's factory-assembled block. This one consists of sixteen 25-kvar 2400-volt units, individually fused, providing 400 kvar. Blocks are available from 250 to 600 kvar, 2400 to 7960 volts —all NEMA-standard sizes. Note that top and bottom plates are drilled for bolting to base support or spacing insulators or to plates of adjacent blocks. Steel frame members are hot-dip galvanized for corrosion resistance and are jig assembled to insure perfect alignment of mounting plates.



Individual expulsion fuse, mounted on the bushing of each capacitor. Uses standard distribution fuse links. These fuses isolate any capacitor that fails before the tank can rupture and damage adjacent equipment. The bank can continue operating until the failed unit is replaced.



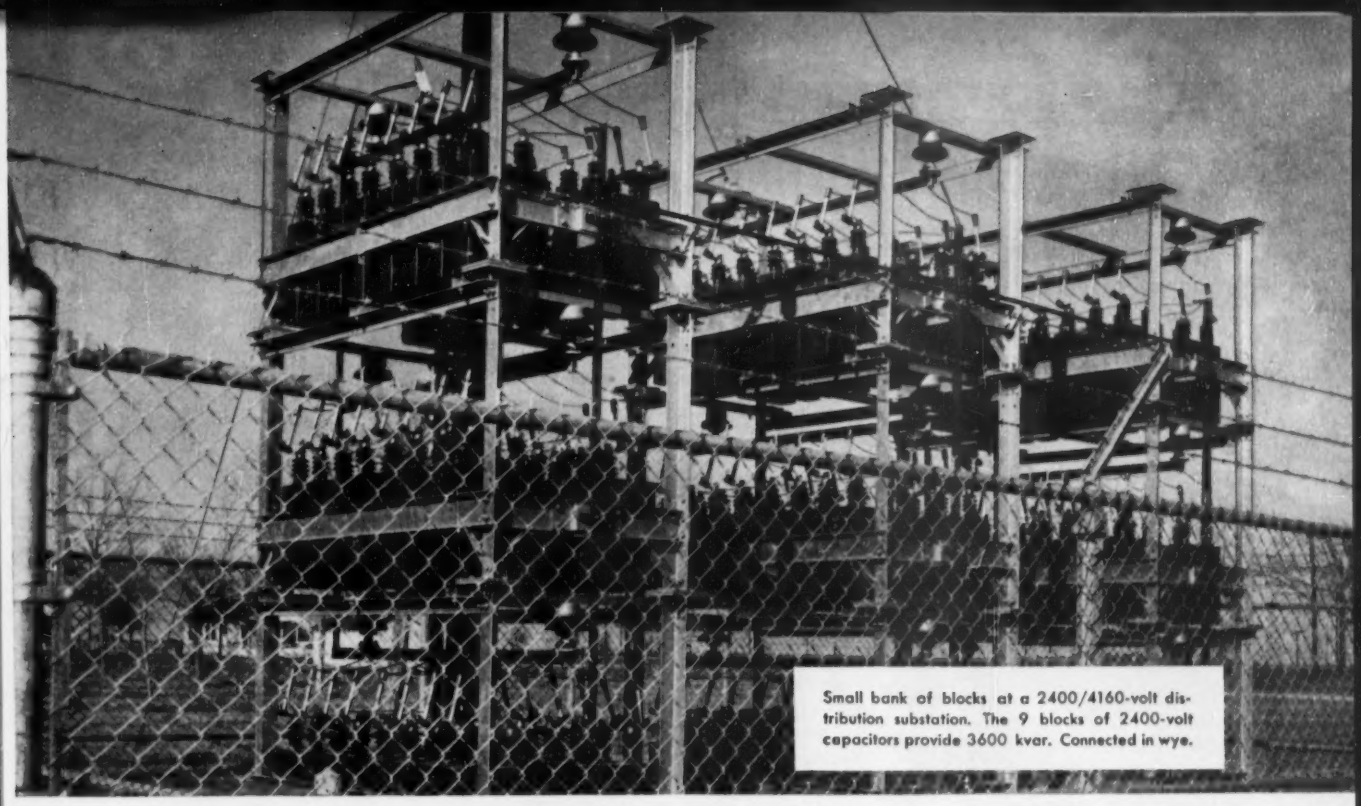


Drawings show arrangement of single-bushing Elemex capacitors in a 400-kvar 7200-volt block.

L-M Factory-Assembled Blocks Are Available in All NEMA-Standard Sizes

Voltage	KVAR	Number of Individual Capacitors Per Block	Rack Dimensions Center to Center of Mounting Plates		
			Length	Width	Height
All sizes available from 2400 to 7960 volts	250	10	3'9½"	All	All
	300	12	4'5"	3'0"	3'9"
	350	14	5'1½"	(total outside width 3'6")	
	400	16	5'8"		
	450	18	6'3½"		
	500	20	6'11"		
	550	22	7'6½"		
	600	24	8'2"		

Mounting Plates
4 ¼"-dia. holes on 5" B.C. in top and bottom plates



Small bank of blocks at a 2400/4160-volt distribution substation. The 9 blocks of 2400-volt capacitors provide 3600 kvar. Connected in wye.

L-M Factory-Assembled Blocks Speed Capacitor Bank Installation

Factory-assembled, wired and fused blocks cut erection costs and time on large or small transmission or distribution capacitor banks.

By **N. K. DELANEY**
Manager of Capacitor Sales
Line Material Company

With the growing trend toward the application of capacitors to transmission lines, the cost of installation becomes a matter of growing concern. Large series-multiple banks can involve hundreds of individual capacitors. Wiring such units and the individual fuses takes many scarce man-hours.

L-M factory-assembled blocks cost only slightly more than the individual, unwired components. They not only cut installation time about one-half, but also save countless hours of engineering and installation supervision.

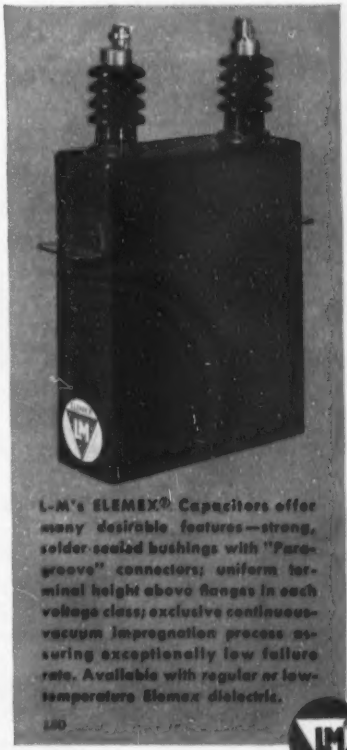
These blocks are built up in stacks, with or without spacing insulators as needed. The only wiring needed is the connections to each block, to obtain any desired series or parallel combination. The blocks themselves provide the steel needed for the capacitor structure. The great saving is obvious.

Another advantage of these L-M blocks is that they are easily moved and reinstalled at another location if conditions should make a change desirable. The rigid frame and sturdy construction make portability practical and safe.

L-M factory-assembled blocks are available with from ten to twenty-four 25-kvar capacitors, giving from 250 to 600 kvar per block, for voltages from 2400 to 7960. For higher voltages the blocks are connected in series. When transmission voltage banks are to be step switched, L-M's exclusive Voltage Divider Switching Method (patent applied for) provides an economical, efficient method for automatic switching.

Check The Costs—See What You Save

Ask the L-M Field Engineer to give you comparative costs of individual components and L-M blocks. You can readily arrive at the possible savings in time and manpower. Or write Line Material Company, Capacitor Sales, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



L-M's ELEMEX® Capacitors offer many desirable features—strong, solder-sealed bushings with "Para-groove" connectors; uniform terminal height above flanges in each voltage class; exclusive continuous-vacuum impregnation process assuring exceptionally low failure rate. Available with regular or low-temperature Elemex dielectric.

LM

LINE MATERIAL *Elemex*® **Capacitors**

Walsh Accepts Portland GE Post

NW utility designates Army Engineer Corps General a vice president, effective July 1. He possesses hydro experience

BRIG GEN O. E. WALSH

Brig Gen O. E. Walsh, former Portland district and North Pacific Division engineer for Army Corps of Engineers, has accepted a vice presidency with Portland General Electric Co. He will take the post July 1 upon retirement from active service with the Corps, according to PGE Pres James H. Polhemus who reported Walsh will deal primarily with the power supply problems of the Oregon utility.

Walsh was appointed division engineer of the North Pacific Division in 1949 after serving as district engineer of the Portland district for more than three years. Both posts brought him into daily and close policy and construction contacts with hydroelectric projects and civil works programs of the Columbia River basin, among them the work the Corps has done in exploring potential dam sites of the basin. He left Portland to take command of the Mediterranean Division in February, 1952, and in December, 1952, was assigned to the communications zone of the European command.

Born in Cleveland, Ohio, Walsh graduated from the U. S. Military Academy in 1918.

WALTER J. MAYTHAM

DALE McFEATTERS

OTIS O. RAE

Westinghouse Appoints 3 VP's

Westinghouse Electric Corp has elected three vice presidents and a new corporation secretary. Newly elected vice presidents are Walter J. Maytham, San Francisco, Pacific Coast regional manager for the firm's Apparatus Division; Dale McFeatters, Pittsburgh, director of information services for the corporation; and Otis O. Rae, Atlanta, Ga., Southeastern regional manager of the Apparatus Divisions.

The post of secretary of the corporation is being filled by E. V. Huggins, New York, vice president of corporate affairs. He replaces C. W. Pomeroy, who has retired after having served as secretary since 1937. Pomeroy joined the firm 46 years ago.

LEE C. HOWLEY

CEI Appoints Howley VP, General Counsel

Lee C. Howley, general counsel for Cleveland Electric Illuminating Co, has been elected vice president and general counsel of the utility.

Howley joined CEI as assistant general counsel in 1951, becoming general counsel a year later. Prior to joining the utility, he was a law director of the City of Cleveland.

His activities include membership on the legal committees of both Edison Electric Institute and Ohio Electric Utility Institute.

He is a graduate of Wittenberg College and Western Reserve University Law School.

•

E. E. MacGilvra has been appointed to the newly created position of executive assistant at Montana Power Co. With Montana Power since 1935, MacGilvra for many years has represented the utility in matters involving lands, claims, and rights-of-way. He will continue these duties and also will assist company executives, managers, and department heads.

Leland Q. Perkins, chief clerk of Otter Tail Power Co's Morris (Minn.) district since 1945, has been named district manager of the utility's Fergus Falls (Minn.) district. He replaces **Trevor Reese,** manager for the district since 1949, who has assumed duties as district manager at Langdon, N. D. Reese succeeds **E. L. Beck,** who is on an extended leave of absence.

LOOK!...

another great technological advance

THE NEW SMD-1 POWER FUSE

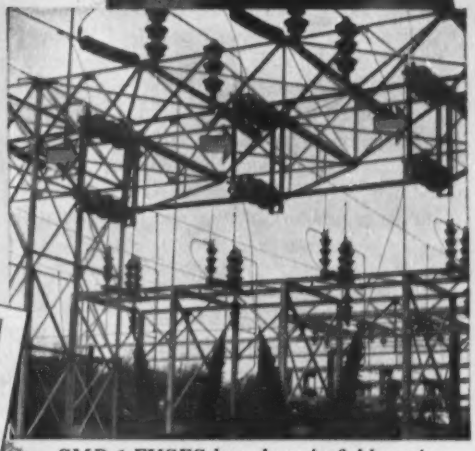
developed to protect your system with the highest reliability, at the lowest cost

S&C's new Type SMD-1—a 500,000 kva* fuse embodying the engineering achievements of the well-known SMD-2—marks another milestone in the fuse art. It has technological innovations which enable it to fill a void in the economics of power system protection.

** Three-phase symmetrical at 69 kv*

DESIGNED FOR APPLICATION on primaries of power transformers tapped directly on transmission and subtransmission lines, Type SMD-1 Power Fuse provides dependable interruption of both high and low fault currents—regardless of type of system or type of fault. Time-current characteristics are accurate and permanent—unaffected by corrosion, aging, vibration, or surges. Transient-recovery voltages are no problem during circuit interruption, since fuse flashover withstandability equals the protected insulation level of the system.

Complete information on how the SMD-1 Fuse will fit profitably into your power system is contained in this new Catalog Section 261 . . . we will gladly send you a copy.



SMD-1 FUSES have been in field service since March, 1952. The fuses have had many occasions to clear faults, and have done so successfully in each case.

S&C ELECTRIC COMPANY

4421 RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS, U. S. A.

IN CANADA:
S & C ELECTRIC CANADA, LTD.
8 Vansco Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Specialists in High-Voltage Circuit Interruption

APPA Elects Schacht President

American Public Power Association's new president, R. L. Schacht (second from left) is shown with the group's other newly elected officers. They are (left to right) William S. Peterson, assistant general manager and chief engineer, Los Angeles (Calif.) Department of Water and Power, executive vice president; W. E. Hooper, general manager of the Sheffield (Ala.) Power and Water Department, vice president; and C. E. Pray, manager of collections and accounts for the Kansas City (Kan.) Board of Public Utilities, re-elected treasurer. Alex Radin, Washington, D. C., was reappointed general manager. Schacht succeeds C. A. Oliver, manager of the Municipal Lighting Plant, Taunton, Mass.

When APPA held its 11 annual convention in Chicago earlier this month, the association presented its Distinguished Service Award to Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of W&P. Morris, a past president of APPA, was cited for long and outstanding service to his community, nation, and the association.

PERSONAL BRIEFS

Storrs M. Bishop, assistant secretary of Niagara Mohawk Power Corp since 1951, has been elected secretary to succeed **Charles A. Tattersall,** who will continue as a vice president and director. Bishop's career with the utility began in 1926.

Walter B. Morton has been promoted from station electrical engineer to assistant electrical engineer of Pennsylvania Power & Light Co. Morton, who joined Pennsylvania P&L in 1945, succeeds **Albert F. Edel,** who has retired. Taking over Morton's former position as station electrical engineer is **Edward W. Taylor. Harlan J. West,** senior project engineer, assumes Taylor's former post as generating station engineer.

E. J. Tribble, former works manager of Worthington Corp's Harrison (N. J.) Works has been named assistant vice president in charge of manufacturing with headquarters at Harrison. In other appointments, **A. M. Tullo,** former works manager of the firm's Wellsville (N. Y.) Works, has assumed the responsibilities of works manager of the Harrison Works. **L. E. Hammer,** former Wellsville assistant works manager, takes over Tullo's former post. Worthington also announced that **Donald H. McCuaig** was made manager of application engineering for the entire Air Conditioning and Refrigeration Division. He was manager of central station equipment section of that division.

Oliver Fuller has been named head of Harnischfeger Corp's new P&H Electrical Sales Division, which will handle sales of P&H electrical equipment. Fuller joined the firm in 1946.

•

Elects 2 Vice Presidents

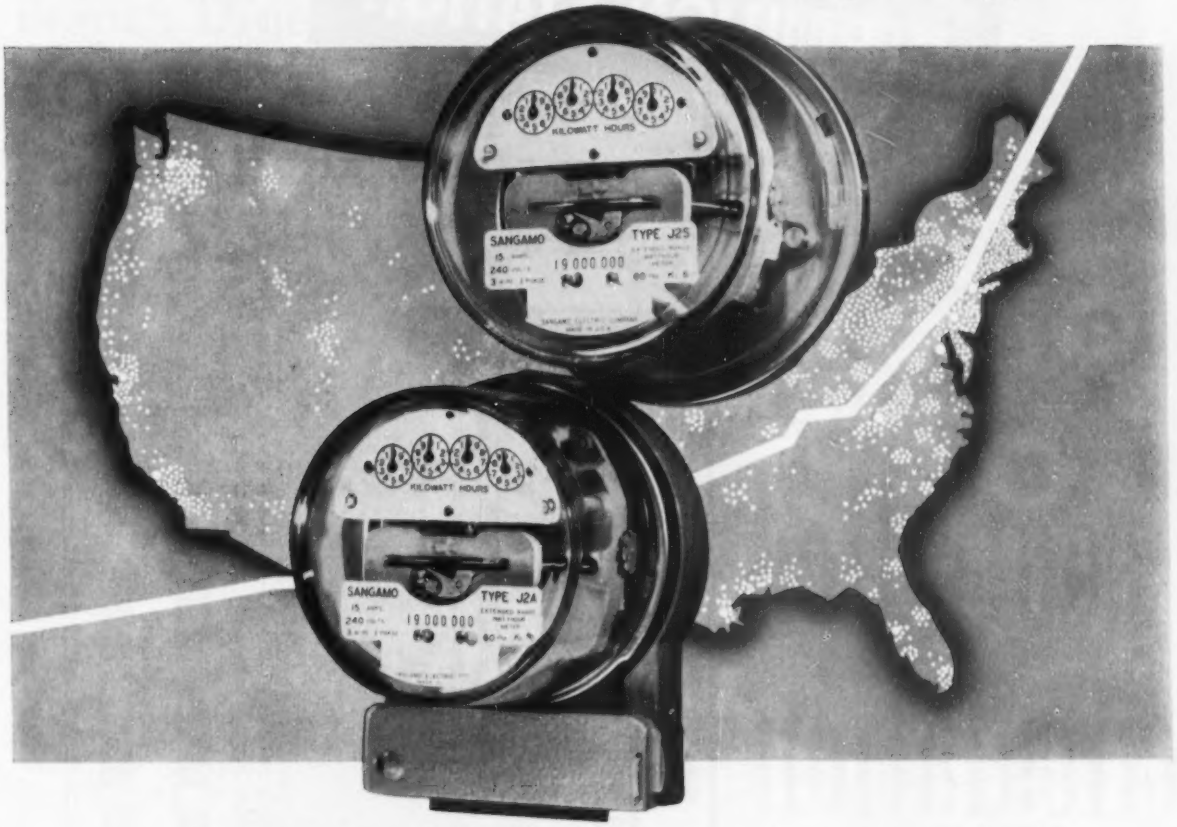
Owens-Corning Fiberglas Corp, Toledo, Ohio, has announced the election of two vice presidents. They are: Edward J. Detgen and William M. Keller. Detgen, a member of the Fiberglas organization since 1945, has been serving for the past three years as general sales manager of the General Products Division. Keller, with the company since 1942, has been general factories manager of the Textile Products Division for the past three years.

J. ROBERT WELSH

Assumes New Duties

J. Robert Welsh has been named vice president and general manager of Southwestern Gas & Electric Co. Welsh, who joined the Shreveport, La., utility in 1940, has been superintendent of operations since 1945 and a vice president since 1949. He became a member of the company's board of directors in 1948. Welsh received a BS degree in engineering from the University of Illinois in 1924.

it's EVOLUTIONARY! it's NEW! the Sangamo Type J2



...to measure the Nation's growing power load

The nation's growing residential power load has led to a wiring capacity crisis that the electrical industry is meeting with a National Adequate Wiring program.

Adequate *measurement* of these heavier loads of the future will require a watthour meter with straight line accuracy up to 100 amperes—a meter capable of handling all foreseeable increases in average residential consumption. That's why Sangamo has developed the J2, a meter with reserve capacity to meet any contingency of future load growth.

The new Sangamo Type J2, with its extended range, will meet all requirements of accurate measurement for both today and the future.

The J2 is not a *revolutionary* new meter, but an *evolutionary* development from the time-proven Sangamo Type J. It retains many features that contributed to the proven electrical and mechanical stability of the Type J. Added improvements all contribute to better and longer performance over its extended operating range.

Get the facts . . . mail the coupon below for your copy of "Protect Your Investment in New Meters." It's just off the press, and gives the complete story of the evolution of the Sangamo Type J2 . . . the Meter with reserve capacity for growing loads.

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ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM54-4

SANGAMO ELECTRIC COMPANY, SPRINGFIELD, ILLINOIS

Send my copy of "Protect Your Investment in New Meters"

NAME_____

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ADDRESS_____

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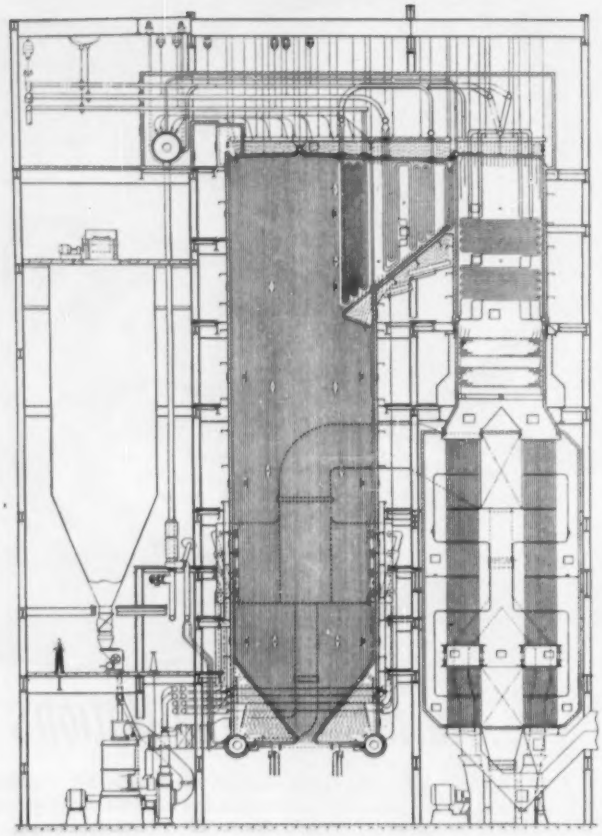
VERMILION STATION

Illinois Power Company

C-E controlled circulation boilers



The C-E Unit shown above is presently under construction at the Vermilion Station of the Illinois Power Company near Danville, Illinois. A second similar unit of larger capacity is scheduled for later delivery.

Unit No. 1 is designed to serve a 75,000 kw turbine-generator operating at a throttle pressure of 1450 psi with a primary steam temperature of 1005 F, reheated to 1005 F.

The unit is of the controlled-circulation, radiant, reheat type with the reheater section located between the secondary and primary superheater surfaces. An economizer section follows the rear superheater surface and tubular type air heaters are located below the economizer.

Pulverized coal firing is employed, using bowl mills and tilting, tangential burners.

B-756

C-E

COMBUSTION ENGINEERING, INC.

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

BOILERS; FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

ENGINEERING MEETING

Branch Urges SEE Engineers to Be Ready for Higher Usage

Utilities must be ready without fail to meet the increased usage of electricity. This was the message of Harllee Branch, Jr, president, Georgia Power Co, in addressing the Engineering and Operation Section Conference of the Southeastern Electric Exchange, held at Miami Beach, Fla., May 6-7.

Branch, also president of the Southeastern Electric Exchange, urged that "we must run the electric business—not let it run us." He said that utilities can meet the problems of inadequate rates, subsidized public power, staggering taxes, rising payrolls, and material costs through research, hard thinking, faith in the future, and a determination akin to Thomas Edison's.

Reaction of air conditioner manufacturers to Union Electric Co's demand for 0.90 pf was reported by W. J. Clapp, president, Florida Power Corp. Consensus of a recent conference is that this goal cannot be attained for 1955 models. But progress before 1956 will boost power factor to 0.75, 0.80, and 0.85 for the ⅓-hp, ½hp, and ¾-hp units, respectively. Each figure is five to ten points better than 1953 models, it was claimed.

Nuclear Power Plant . . . Economy in production cost is a primary goal for the recently announced 60-Mw nuclear power plant, said Philip M. Ross, manager of Westinghouse Electric's Reactor Design Department. Among the many opportunities for savings in a non-military installation are:

1. All radioactive material will be confined to the reactor building.

2. Fuel will be natural uranium with minimum enrichment for fission process rather than costly, highly enriched military fuel.

3. Moderator as well as coolant will be ordinary water under pressure.

4. Long fuel life and almost complete ultimate burn-up may cut reprocessing costs.

Objective of completion within four years determined choice of converter type of reactor, Ross continued. Only reason for passing up the breeder type is longer completion time because of present technical delays.

Dispute on Voltages . . . General Electric Co's D. K. Blake again assured utility engineers that 4-kv primaries and 120/240-v secondaries are fully adequate for foreseeable future needs. But this does not imply that higher voltages are not more economical, he added. Full development of electric utilities will force them to invade the field of heating now served by gas.

Subtransmission must go up to 69 kv, Blake continued. And if a utility wants to boost primary voltage, an early change saves more money. But future residential service at 240/480 v Blake predicted is "not in the cards." Only hope for this lies in collecting industry data to find whether customers can save enough to justify the cost of changing.

SEE PRESIDENT, Harllee Branch, Jr. Georgia Power Co, addresses luncheon meeting of Engineering and Operating Section

A five-point program was advocated by R. H. Joerden, Arkansas Power & Light Co, for residential area distribution. Points are:

1. Primary grid 4-wire Y-connected.

2. Single-phase transformers limited to 50 kva; 3-phase provided by adding a 25 kva in open delta.

3. All 120-240-v secondaries No. 2 copper or equivalent designed for 2% initial voltage drop and capable of serving 5-hp motors.

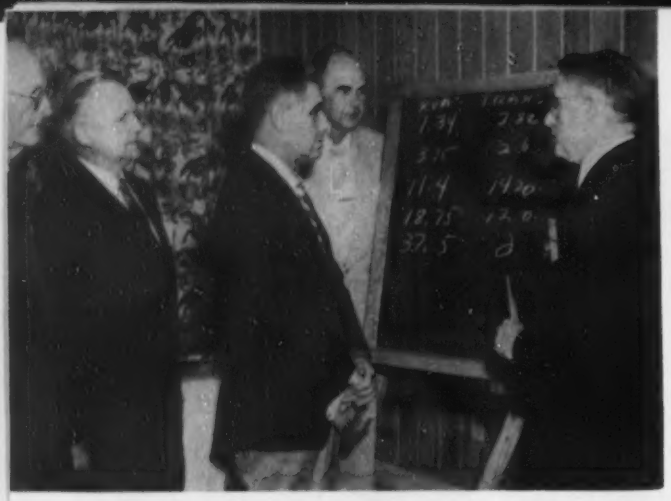
4. Three-phase extensions by adding fourth No. 2 to 120/240-v mains.

5. Install secondary capacitors to boost power factor to 95%.

Voltages over 600 can appear on 240-v winding of an open-Y, open delta transformer installation if secondary capacitors connect across the open delta and one primary fuse blows. This connection should be avoided, but single-phase capacitors across the lighting transformer secondary very effectively cut transformer currents, reported E. L. Bivans and V. B. Nolan, Florida Power & Light Co.

Leonard Olmstead, associate editor of Electrical World, presented a report on the magazine's Overhead Distribution Survey (EW, May 17, pp 133-143).

INSULATOR WASHER is demonstrated by H. L. Allen, Florida P&L, to J. H. Wells, Alabama Power; S. L. Muths, Mississippi Power; George C. Kinsman, Florida P&L



SYSTEM PLANNING is discussed by D. K. Blake, GE, (right) with (l to r) L. M. Oliver, Georgia Power; C. W. Schweers, Allis-Chalmers; R. H. Fite, Florida P&L; and W. J. Clapp, Florida Power

STREET LIGHTING EQUIPMENT is demonstrated by Stacy Standley, Line Material Co, (pointing to the display) to speakers who addressed the Distribution Section meetings of the SEE conference

Storm Restoration Program . . . Florida Power & Light's storm restoration program has resulted in the restoration of the majority of services, days sooner than otherwise would have been possible, according to George Kinsman, operating vice president. He said that increased efficiency in routing of crews has reduced materially the over-all time required. Revenue recovered justifies the $50,000 per year training costs for a storm once every ten years.

Microwave offers the most economical plan of communication for utilities when three or more channels are required between two locations, declared W. J. Wortman, Duke Power Co. It is possible to justify microwave under some conditions even though only one or perhaps two channels are required. Wortman estimated that the cost of maintaining Duke's installation is now 40.2¢ per channel mile per month.

The Installation of expulsion tubes on existing unprotected lines offers the most economical means of reducing lightning tripouts, according to N. H. Erlandson, Carolina Power & Light Co. This will not give the protection obtained from lines having static wires. The installation of expulsion tubes may, in some instances, require the slowing down of the instantaneous ground relays. Use of the "flying tap" on wood pole lines increases the impulse value of the structure, resulting in a reduction of tripouts.

According to C.W. Cogburn, Florida P&L, the annual wages of a crew of substation operators will purchase and install sufficient supervisory control and telemeter equipment to replace the substation operators. This includes the initial cost, annual investment cost, annual channel cost, and annual equipment maintenance cost.

A reduction of only 1% in fleet mileage of Alabama Power Co would result in a net annual saving of approximately $8,000 in operating and maintenance costs alone, said J. L. Wells. Passenger cars and pick-up trucks offer the best field for reduction in mileage as they turn up most of the fleet mileage (85%) for Alabama Power Co.

Unit costs are about the only *facts* involved in determining the economy of a power station building, in the opinion of W. F. Ryan, vice president, Stone & Webster Engineering Corp. The critical factors are how much building and what kind. Although pertinent data on outages, maintenance costs, and other matters are being accumulated, he stated that the answer to these questions is still a matter of judgment.

Aerial Cable . . . Upwards of 100 conductor miles of aerial cable has been Florida P&L's solution to devastating storms, said Frank E. Treat. Voltage ranges from secondaries to 13 kv. Field assembly of metallic-shielded, rubber-insulated cable with neoprene jacket to a pre-stretched messenger by spinning on two No. 11 copper wires has become the preferred method.

Experience since 1945 shows only 18 service interruptions from cable failure, a rate of 3.62 per 100 cable miles per year, Treat continued. The worst problem has been terminations for 13-kv cable in areas of atmospheric contamination. For these, compound-filled porcelain terminals with compression grommets over the cable seems most satisfactory.

A simplified approach to determining fault currents on Y-connected distribution systems was presented by H. B. Balfour, Jr, Louisiana Power & Light Co. Technical difficulties associated with symmetrical components are largely overcome by organization of data and graphical methods.

Capacitor oil switches can be exposed to re-striking by capacitors added elsewhere on the system, said John W. Hunter, Carolina Power & Light. Remedy in one case was resistor grids on the oil switch contacts. One solution to telephone interference from third harmonic current flowing into grounded neutral capacitor bank may be second capacitor placed elsewhere to cause more interference to negate the offending source.

J. E. Barkle, Westinghouse Electric Corp, described a new relay which is claimed to offer an entirely higher order of loss-of-field protection for all types of synchronous machines. He said that it protects against dangerously low excitation as well as complete loss-of-field and can be used either to trip immediately or only when tripping is absolutely necessary.

Wound-rotor drives show the lowest annual cost of any of the variable speed combinations for power plant auxiliaries, according to W. P. Gavit and W. G. Fraser, Jr, United Engineers & Constructors, Inc.

Combined use of voltage regulators and shunt capacitors in distribution systems will provide the lowest cost means of supplying the qualities of regulation needed near the loads, said R. M. Butler and D. R. Samson, General Electric. Used jointly, they serve to add much additional load-carrying ability to the system.

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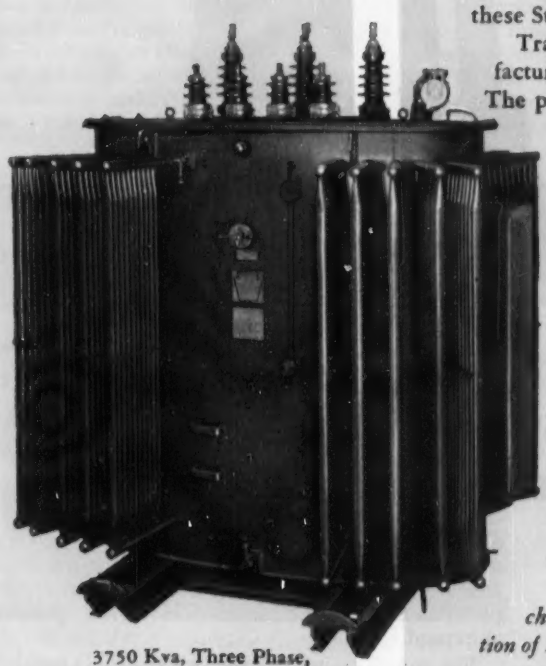

3750 Kva, Three Phase, 60 Cycles.
34,400△-4360Y/2520x 8720Y/5040 volts.

Here's another example of money saved and a quick delivery made on a 3750 Kva transformer that qualified as a Pennsylvania Standard Parts Power Transformer. Today, more than ever before, purchasers are recognizing the advantages of ordering transformers that conform to ASA Standards C57.12a. (Transformers covered by these Standards are similar to the Standard Parts Power Transformers that Pennsylvania has been manufacturing for 6 or 7 years.)

The primary advantage of Standard Parts Power Transformers is the fact that savings up to 8% are possible, even if requirements are not quite standard but are within the limits of the C57.12a Standards. That is because the Standard Parts transformer has liberalized high voltage ratings, which give the purchaser an opportunity to buy a standard transformer that meets the specific requirements of his System.

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Standard Parts Power Transformers are available in single phase sizes up to 5,000 Kva, 69 Kv; and three phase sizes up to 10,000 Kva, 69 Kv. Standard Parts Power Transformers can be purchased at worthwhile savings because of quantity production of standard parts produced with adequate tools and equipment. This has improved the quality of the workmanship, reduced the possibility of errors, and permitted more rigid inspection during the various stages of production.

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new—

Developed to provide fast arc interruption on both high current faults and low current switching

The interrupting unit consists of the familiar *Turbo Ruptor* device supplemented by an oil jet arrangement. The contact structure combines a tulip type stationary contact with a bayonet and a high speed sickle contact.

This device has been tested from line switching values to 10,000,000 kva in combination of field and laboratory tests. It is but one feature of the outstanding BZO line of breakers — the line that also offers mechanically trip-free pneumatic or *Pneu-Draulic* operating mechanisms, and complete assembly and mechanical testing prior to shipment.

For complete information on the BZO breaker, call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4347

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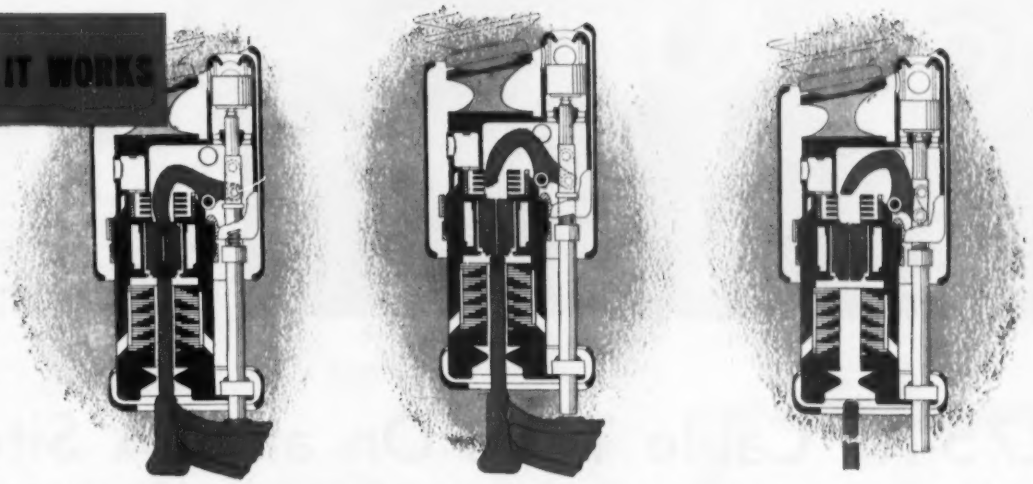
ALLIS-

"Turbo Jet" Interrupter

HOW IT WORKS

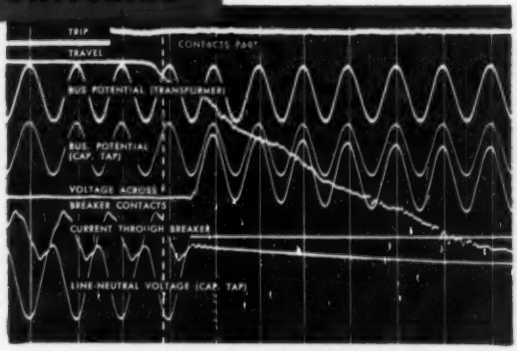


CLOSING — As cross-head and bayonet move upward to close, pushrod is forced upward to charge oil jet activator, and close upper contact. Simultaneously, piston permits oil to pass into upper chamber through a disc valve. Upper and lower movable contacts make contact with stationary element and breaker is closed.

OPENING — Cross-head is driven downward by accelerating spring. Upper contact opens and activator forces oil jet through laminated grid across arc path. Lower contact enters helical passage drawing arc which gasifies a portion of oil, forming a gas bubble. Oil swirls against lower portion of arc and disrupts it.

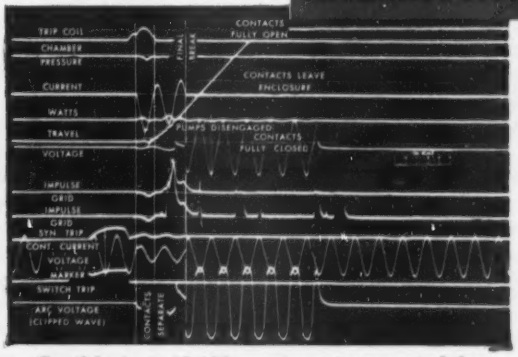
The increasing bubble pressure in lower chambers forces dielectrically unimpaired oil to swirl through arc path, preventing reestablishment of the arc. Complete withdrawal of bayonet from throat permits high pressure gas bubble to escape. *Ruptor* chamber refills with oil through refill holes in hood.

LOW CURRENT SWITCHING



Here's 187.8 mile line dropping test. Interrupting time was 1.71 cycles. No restrike.

HIGH CURRENT INTERRUPTION



In this test 46,400 amperes interrupted in 2.60 cycles — 122 percent ampere rating.

CHALMERS

A-C ALLIS-CHALMERS

TESTS on 275-kv cable test samples began with the switching on by F. J. Lane, BEA transmission design engineer. The Staythorpe testing facilities were inaugurated at ceremonies on March 25

275-Kv Cable Tests On at BEA Site

Three leading British cable manufacturers have submitted 100-yd loops of single-core, 275-kv cables for the first tests now in progress at the new testing site at Staythorpe Power Station, Newark, Nottinghamshire, the British Electricity Authority has announced. BEA's test facilities were inaugurated March 25.

British Insulated Callender's Cables, Ltd, Enfield Cables, Ltd, and Pirelli-General Cable Works, Ltd, submitted the test lengths, together with straight joints and sealing ends. Intensive field tests will take approximately two years.

Although the nominal voltage of the cables is 275 kv, they may be required to work continuously at 300 kv and to pass an impulse test of 1,050 kv. It may be some time before 275-kv cable will be required commercially. BEA and the cable makers have decided, however, that the interim tests can provide experience of great value.

The test lengths are connected in series with one phase of the 275-kv overhead line linking Staythorpe and West Melton, Yorkshire. These stations are the termini of the 42-mile, semi-experimental section energized last July 16 (EW, Aug. 31, 1953, p 32).

Any of the cables can be switched in or out of the circuit by means of isolating switches at the testing ground. Surges to which the cables are subjected are measured by a surge recorder. Sheath temperature measurements ascertain the maximum temperature of the conductors during load cycles, and records are kept of the voltage and load on the overhead line.

BICC's Samples . . . BICC has submitted a 275-kv impregnated pressure cable and a 275-kv oil-filled cable. The first is designed to operate at a maximum stress at the conductor of 110 kv per cm, under a nitrogen pressure of 200 psi. The overhead line being lightly loaded, a special type of conductor arrangement permits the conductor to attain a temperature of 80 C, maximum designed temperature for such cables under full load.

The conductor arrangement consists of a stranded center of 61/.083-in. aluminum wires, covered with a paper separator, over which is stranded a single layer of 47/.066-in. aluminum wires. The wires carry the current, giving an effective conductor area of 0.16 sq in.

This conductor is screened with metallized paper tapes over which the paper insulation is applied. The lead-alloy sheath is reinforced with tin-bronze strips applied both longitudinally and around the sheath, and an anti-corosive protection of PVC, rubber, and hessian is applied over all. Total diameter is 3.87 in.

Oil-Filled Cable . . . BICC's 275-kv, oil-filled cable has also been designed for a maximum stress at the conductor of 110 kv per cm. It consists of a 16-mm oil duct around which is formed the conductor, comprising 111/.074-in. tin-bronze wires giving a conductor area of 0.46 sq in. Special arrangements permit the conductor to attain 80 C. Tin-bronze wires give an increased resistance and consequent temperature rise.

This conductor is screened with metallized paper tapes, and over the paper insulation is applied a metallic screen and a copper-woven fabric tape. The lead sheath is 0.115-in. thick, giving the cable a diameter of 3.43 in. The reinforcement is tin-bronze strips, and anti-corrosive PVC, rubber, and hessian are applied over all. Diameter is 3.64 in.

The installation includes an impregnated pressure straight joint of a new type. The electrical design is similar to that for lower voltage impregnated pressure cable, except that cast plumbs have been replaced by a mechanical sealing arrangement and the inner lead sleeve has been omitted. Conductors are joined by a soldered,

NO. 7 IN A SERIES

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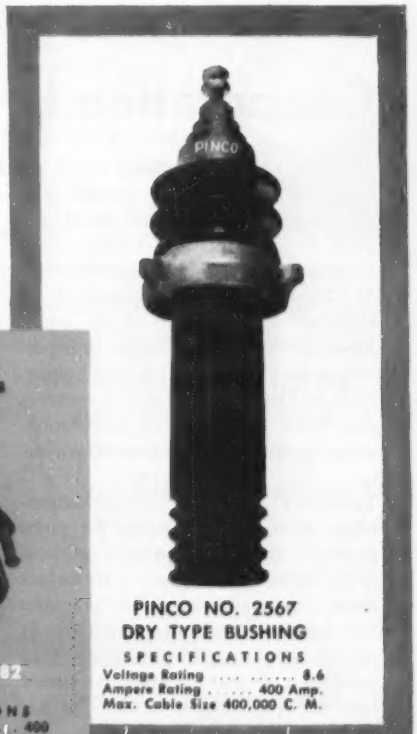

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flush-fitting ferrule whose overall diameter equals the diameter of the conductor. The sealing ends are a condenser cone arrangement housed in anti-fog porcelains capable of withstanding internal pressure of 200 psi. The condenser cone arrangement permits a relatively small diameter of porcelain.

The straight joint and sealing ends are specially designed, the sealing ends using the same type of porcelains as the impregnated pressure cable sealing ends.

Enfield Cables . . . Enfield's cable is the outcome of experience with 220-kv, self-contained compression cables installed at the Fontenay Testing Center of the Electricite de France and with experimental cable at Enfield's high voltage laboratory at Brimsdown.

The cable has an 0.4-sq in. oval conductor screened with carbon paper and designed to withstand a maximum stress of 150 kv per cm under a nominal gas pressure of 250 psi. Dielectric thickness is 0.8 in. Nominal loading is 200 Mva and actual loading 120 Mva. With an overall diameter of 3.7 in., the cable weighs 161 lb per single core ft. A sample withstood an impulse test of 1,050 kv peak. Since installation, the cable withstood a dc test voltage of 550 kv for 15 min.

Construction of cable and joint follows the usual design for self-contained compression cable. The cable is terminated in double-shed, anti-fog pressure porcelain sealing ends. Prefabricated condenser cones manufactured by Standard Telephone & Cables, Ltd, terminate the cable inside the porcelains.

Pirelli-General's Sample . . . Pirelli-General has submitted a 275-kv, oil-filled cable. To match the overhead line, a prototype cable having a 0.4-sq in. conductor was required. As available transformers will not fully load a cable this size, a conductor of 70/30 brass wire has been used. This enables design of a cable having the electrical and mechanical characteristics to meet the trial installation conditions with negligible change in conductor and insulation from the standard 0.4 sq in. cable.

The conductor is screened and lapped with paper tape giving a dielectric of graded construction which is externally screened with metallized paper and single lead sheathed. The lead-alloy sheath is reinforced with bronze tapes and protected overall with an anti-corrosive serving. The total diameter of conductor is 3.18 in.

Cooperation Urged in Rural Electrification

Full cooperation among rural cooperatives, municipally owned utilities, and private companies would appear to do much to further rural electrification. This suggestion by M. M. Koch, Public Service Co of Colorado and president of the Rocky Mountain Electrical League, was presented at the league's spring conference in Denver, May 2-4. Conferees also heard discussions on distribution, steam power trends, adequate wiring.

Teamwork . . . The obvious advantages of teamwork should be more generally applied to the rural segment of the industry, said Koch. This should mean joint talks regarding planning and solution of mutual problems. It should also mean coordinated load building to show the rural consumer how to aply electric power for his profit and better living.

For the Colorado River basin states this river has been aptly named the last waterhole, but it is not the last or only power source, emphasized L. R. Patterson, PS of Colorado. The thermal power-producing potential of the upper basin dwarfs the hydroelectric power potential of the upper Colorado River.

Ultimate development of the Colorado River storage project will lead to a total capacity of 1,600 Mw but will take nearly 30 years more. Nine companies have proposed taking all the power from the project. They now have 90 power plants with a total capacity of 1,250 Mw, about 1,000 Mw in steam. By 1960 they expect to double steam capacity.

Features of a compression fitting should be incorporated into bolted fittings for distribution use, explained C. B. Sorflaten, Kaiser Aluminum & Chemical Sales. These features are: extremely high applied total pressures, curvature of wire bearing groove to conform to conductor shape, proper length of conductor groove, and materials usually the same as conductor.

In overhead distribution, said E. A. Casey, Anaconda Wire & Cable Co, 50-75% of conductor needs formerly met by copper will be met by aluminum. Lightweight steel core designs for ACSR are drawing attention. And for service drops Anaconda believes a two-layer combination (polyethylene or other thermoplastic insulation and neoprene or other rubber-like jacketing compound) is superior electrically to any single-layer construction of a neoprene insulation type of compound.

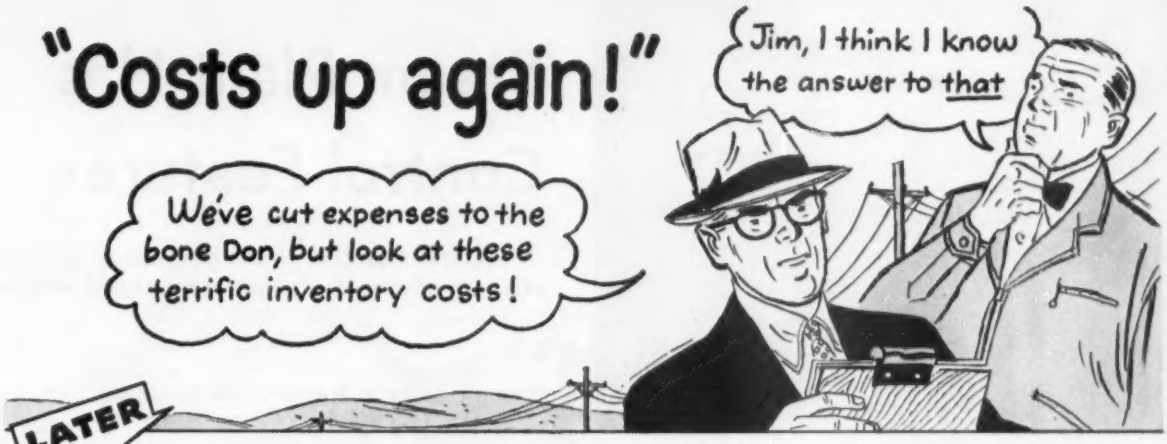
W. L. Immer, General Electric Co, said all cable makers will soon be able to supply cables with butyl rubber insulation for 35-kv operation over a wide temperature range. Silicone insulation is being used where size, weight, and resistance to heat are paramount considerations.

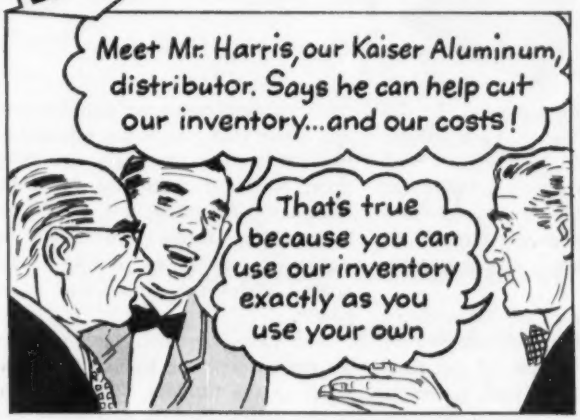
Increasing popularity of reheat is shown by the fact that it was called for in over 80% of the large units ordered in 1953, reported F. X. Gilg, Babcock & Wilcox Co. Average size of new boilers for large stations is almost 1 million lb/hr. B&W is building one 1.7 million lb/hr unit to serve a 250-Mw machine.

Decreasing Lightning Trip-outs . . . Aerial ground wires and ground fault neutralizers have markedly decreased lightning-caused trip-outs, reported L. M. Robertson, PS of Colorado. These average trip-outs per 100 miles per year on 44, 69, and 115-kv lines were cited: With no ground wire, wood—12.8, and steel—21.1; with ground fault neutralizer, wood—5.3, and steel—6.7; with one ground wire, wood—7.0, and steel—6.5; with two ground wires, wood—0.

Lee Jones, Colorado Central Power Co, said a 13.2-kv system eliminates three to five times the number of substations for the same load compared with a 4-kv system. Along with lower cost secondary rack construction should cut linemen's time in the air compared with crossarm and bus construction.

"Costs up again!"

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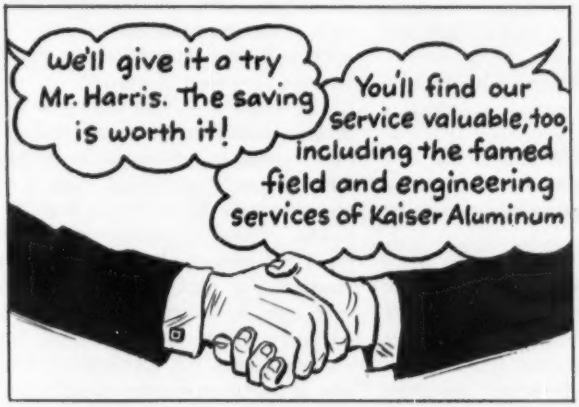
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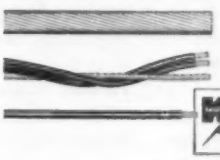

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CONTROL ROOM at Moncks Corner, showing instruments and glareless lighting, is center from which all the plant operations are directed

Steam Plant Has Control Features

South Carolina PSA generating station presents advanced, danger-proof signal system

ROGER E. MARION, Chief Control Engineer, Ford, Bacon & Davis, Inc. New York, N. Y.

Features in remote and automatic control at the new Moncks Corner steam electric generating plant of the South Carolina Public Service Authority are directed toward simplified operation and minimized crew. Situated near the Santee-Copper hydro project, the $14.5-million plant is operated in parallel with the hydro units and uses either coal or oil.

The controls were designed for a plant having two 40,000-kw units with provisions for expansion to 300,000-kw capacity. The turbine generators are 30-psi hydrogen cooled, tandem compound, 900 F, 850 psi, 28½-in. vacuum, equipped with direct exciters. Even though pressure gages indicate ranges up to 2,000 lb, the pressures on control instruments do not exceed 15 lb.

Signals from all points of the plant are brought to the control room by using compressed air and, in some instances, electrical impulse as secondary media. These media are calibrated to an exact ratio of the original pressures they are transmitting. No liquids or high temperatures are involved in the transmission.

Vertical mercury manometers indicate liquid levels at the remote plant locations. These manometers are used to activate the annunciator alarm system. In place of a basic means of detecting high or low level at the tank proper wired to the annunciator, low-pressure Mercoid switches are mounted inside the control room panel. These obtain their impulse through the air loading operating the manometer.

Distinguishing Signals . . . Mounted across the top of the instrument boards are 18 annunciator cabinets. To distinguish a new signal, each cabinet has a name plate, back-lighted with red bulbs, which shows a bright red glare at the initiation of each new alarm. This immediately attracts the operator's attention to the proper annunciator panel.

This red signal is extinguished simultaneously with the silencing of the alarm horn by use of the reset button. The regular signal, however, is not affected.

In the control room the concentration of instrument locations facilitates operation of the plant by attendants. This arrangement proved its value in an emergency situation in which a boiler produced excessive temperatures. Loss of the boiler, the only unit then in operation, would have left a 90-mile section of line without power.

The run-away temperatures were brought within proper limits by the plant superintendent who directed all operations from the control room. Guided by the control room instruments, he advised various operators over the loud-speaker telephone what to do. He remained in the control room until the instruments assured him that the boiler was no longer in danger of going off the line.

Considerable planning went into control room lighting that would facilitate the reading of instruments. The lighting is so arranged as to eliminate bright spots and glare from the instrument faces.

Turbine Supervision . . . The turbine room also has features of interest. Heavy-duty, soot-blower air compressors; instrument air compressors; and boiler feed pumps are adjacent to the turbines on the main operating floor. Normally, such units are in the basement. The Moncks Corner plan by enabling turbine attendants to maintain supervision during their normal duties saves time and manpower.

Stop valves have been omitted from the main steam line leading from the boiler to the turbines. The function of the stop valves is performed by the turbine automatic stop valve. Thus, two expensive extra valves, one for each unit, and their necessary maintenance have been eliminated.

The sound-absorbing ceiling of the turbine room is an advanced construction feature. Its advantages more than offset the small additional expense of approximately 7¢ per kw of capacity.

The ceiling, composed of corrugated and perforated aluminum sheets supporting a rock wool insulator is very light in weight. This ceiling is not only esthetically appealing but also eliminates the high-pitched volume of sound emanating from the turbine and generator rotating at high speed. The designers considered the elimination of turbine room noise a large factor in personnel efficiency.

Air is blown into the plant's ventilating system by fans deployed in critical high-temperature areas. This air is forced to follow a path to and alongside the boiler to the forced-draft fans which, in turn, drive it into forced-draft air ducts for use as both primary and secondary combustion air. Roof ventilators and adjustable air admission louvres provide seasonal control.

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The tremendous progress in instrumentation that has come out of Honeywell's intensive development program has made many older instruments obsolete. Modernizing your plant instruments, to take full advantage of this progress, can bring you a number of specific benefits.

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Consumers Power Labor Pact

Settlement of Michigan utility-UWUA dispute was based on recommendations made by Fact-Finding Commission

Consumers Power Co and the Utility Workers Union of America—CIO have reached an agreement on a new contract covering the company's operating, maintenance, and construction employees. The settlement was based on the recommendations made by the special Fact-Finding Commission which was created on March 5 by Governor G. Mennen Williams of Michigan.

Commission Members . . . The voting members of this special commission consisted of Charles C. Killingsworth, East Lansing, chairman; William J. Balgooyen, Muskegon Heights and Edward C. McCobb, Grand Rapids. The nonvoting members were H. Stanley Richmond, vice president of Consumers Power, representing the company and Garland W. Sanders, president of the Michigan State Utility Workers Council, representing the union.

The commission stated in its report that the 1954 labor negotiations between the company and the union involved some 70 issues. A little more than half were settled by the parties, leaving 32 issues sent to the commission for recommendation. Of these 32 issues, 24 were union demands.

The principal economic dispute evolved from UWUA's request was "substantial" wage increases. UWUA held that Consumers' rates were far below those of other large utility companies in the United States, especially those of the closest company—Detroit Edison Co. Consumers Power held that its wage rates were comparable to those of other companies serving medium-sized towns, none of which were more than 200,000 population.

The commission said in its report that the "data show that a number of company wage structures, in the utility industry and in other industries as well, recognize a differential between Detroit and outstate Michigan. Thus, although this company's wage level appears to be somewhat below that of some other utility companies of comparable size, some such differential is not inconsistent with the prevalent practices in general industry."

After weighing the above, the commission recommended and the company and union agreed to the following wage increase:

- 6¢ an hour for employees earning $1.80 an hour or less;
- 7¢ an hour for those earning more than $1.80 an hour but less than $2.14 an hour, and
- 8¢ an hour for those earning $2.14 an hour or more.

These increases became retroactive to March 1, 1954.

Broadened hospitalization insurance was recommended and accepted by the parties, including 120-day coverage for employees with full company payment of the premiums. Employees would continue to pay premiums for dependent's coverage. Retired workers would be allowed to participate in the group hospitalization plan at their own option and expense.

Some other fringe adjustments were granted by the company in accordance with the suggestions contained in the fact-finding report.

H. S. Richmond, vice president of Consumers Power, said that when the changes in the working agreement are applied to UWUA members and comparable benefits are extended to other employees, the increase in the company's costs will amount to "almost $1.7 million a year." "It is obvious," he said, "that operating costs is one of the important factors on which electric and gas rates must be based."

LABOR BRIEFS

Robert D. Allen, Consumers Power Co, Leonard W. Golden and Edwin H. Seim, Westinghouse Electric Corp, and Clarence F. Logan, Central Illinois Public Service Co, are among the 30 young executives who have been awarded Sloan Fellowships for participation in the Executive Development Program at the Massachusetts Institute of Technology. The program will begin at MIT in Cambridge on June 19.

Pacific Power & Light Co and IBEW-AFL have agreed to a paid day off for an employee's birthday in lieu of an eighth holiday. The contract, retroactive to March 26, provides for an increase in wages of 1.15%.

ECPD Surveys Awarding Of Professional Degrees

The Recognition Committee of the Engineers Council for Professional Development, under the chairmanship of R. H. Barclay, has completed a survey of the awarding of the professional degrees by various engineering institutions.

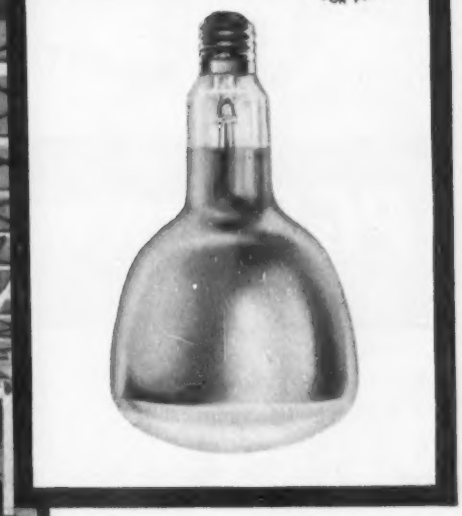
Questionnaires were sent to 146 institutions with 142 of them sending back answers. This excellent response will serve as a basis for formulating recommendations concerning the practice of awarding the professional degree as a means of professional recognition.

Of the engineering schools surveyed, 89 award the professional degree while 62 do not. Of the 86 awarding the degree, 74 use professional experience as a basis for awarding the degree, eight require resident graduate study and four include both professional experience and resident graduate study as prerequisites for awarding the professional degree.

In regard to their future plans concerning the professional degree, 69 colleges will continue awarding the degree, two will institute the professional degree, 13 will abandon it, 49 will continue not to award it, and 17 are uncertain as far as future plans are concerned. The survey shows that approximately 20% of the schools offering the professional degree have either dropped it or are making plans to do so.

The committee also reported an increase of about 80% in the awarding of professional degrees in the last five years as compared with the previous five-year period. In the last ten years, 1,387 to 1,398 professional degrees have been awarded, and of these, 917 to 922 have been awarded during the last five years.

Here's Better
HIGH-BAY LIGHTING
...at lower costs!



Brilliant, new Sylvania R-52 Incandescent Reflector Lamps help raise production records, reduce maintenance.

Results show that R-52 Reflector Lamps greatly improve factory seeing conditions and enable workers to step up production.

The special reflector on the inner surface of this lamp is designed to concentrate a clear, bright light directly on the working area. And, because the reflector is sealed in, it cannot become smudgy from dust or smoke. The Sylvania R-52 permits an upward component of cheerful, over-all reflected light. Thus, you get a better maintained level of light . . . at low maintenance costs.

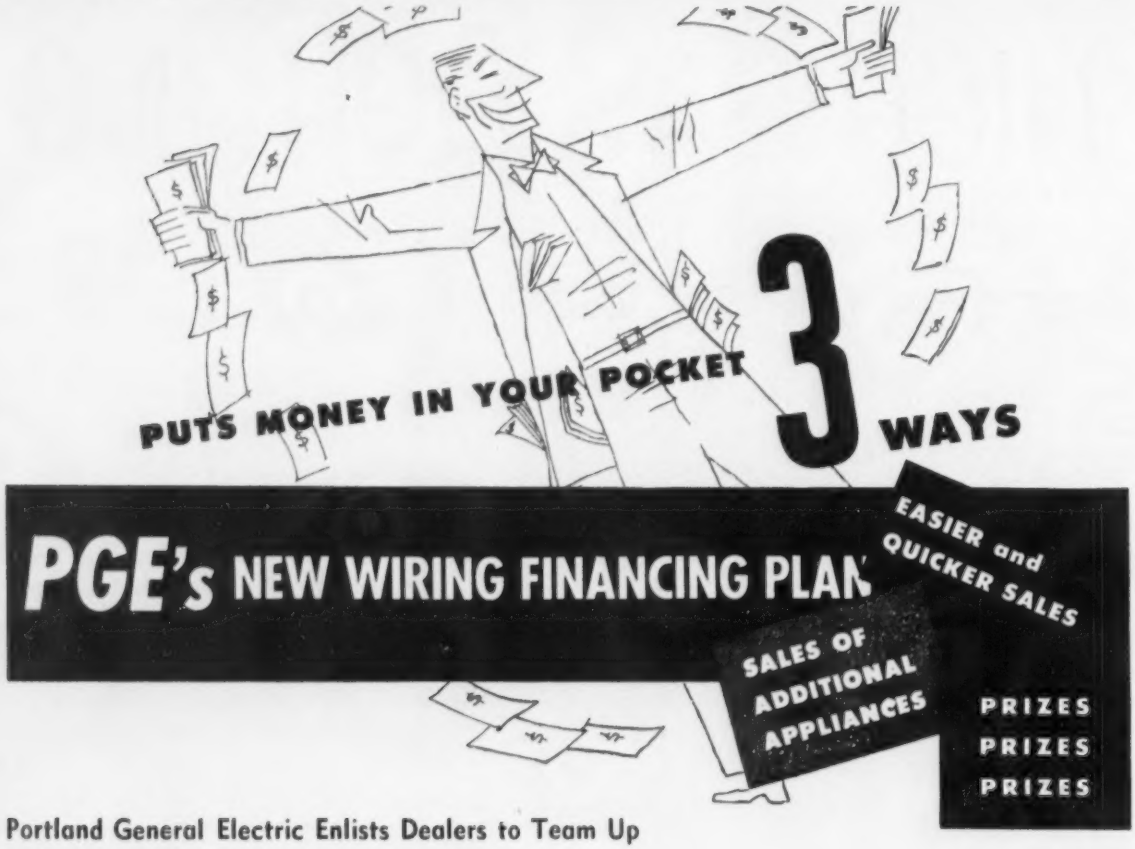
Sylvania R-52 Reflector Lamps are available in 500-watt and 750-watt sizes. For full details call your Sylvania Representative or write to Dept. 4L-2815, Sylvania today.

SYLVANIA

Sylvania Electric Products Inc. 1740 Broadway, New York 19, N. Y.

In Canada: Sylvania Electric (Canada) Ltd.,
University Tower Building, St. Catherine St., Montreal, P. Q.

LIGHTING · RADIO · ELECTRONICS · TELEVISION



Portland General Electric Enlists Dealers to Team Up

Wiring Financing and Appliance Sales

"It's been 15 years since we've been together in close association in a common effort in the business we're all concerned with—electric appliance sales."

With that statement, made April 27, Portland General Electric Co sales manager, C. W. Brissenden, broke the ice on the Oregon utility's double barreled sales campaign keyed to the introduction of PGE's new "pay as you go" wiring financing plan. He spoke to some 600 retail appliance dealers and salesmen from all over PGE's 2600 sq mi territory.

By week's end the color advertisements in the Oregon daily press, car cards and billboards, window banners and radio and television programs had carried details of the wiring plan and the consumer contest to the public. By August 1 PGE hopes the appliance dealers of its territory will know by experience what Frank M. Warren, Jr, executive vice president, meant when he declared "We are taking you back into a sales promotion era."

The wiring financing program will be a permanent PGE policy, one that is new to the Pacific coast and perhaps elsewhere in the utility industry, except for Cincinnati, Ohio, from where the Oregon company's inquiries drew information helpful for charting the PGE plan.

Brissenden's outline centered on simplicity and convenience. PGE customers will be able to acquire adequate home wiring on a 12, 24 or 36 monthly payment plan at normal FHA terms up to $350 and the charges will be added to their regular electric bill.

In PGE's instructions to the appliance dealers, the steps, upon learning lack of wiring is holding up a sale, are:

1. Determine if the prospect is a PGE customer and property owner rather than tenant.

2. Explain the low monthly wiring financing terms, which may be paid on the electric bill.

3. Help the prospect contact an electrical contractor who can survey the job and prepare a cost estimate.

Consumer attention to the wiring plan involves two weekly prizes for eight weeks, a range and one of several major appliances for second place for the weekly winners of a contest on completing in 25 words or less the statement—"Every home should have adequate wiring because. . ." The eight first prize winners will be eligible for a grand prize of a $3,000 all-

electric kitchen which will feature complete transformation of the household kitchen, including planning, remodeling, wiring and plumbing and outfitting with a new range, refrigerator and dishwasher plus other appliances.

Since each consumer entry on the supplied contest form must be validated at an authorized appliance dealer store, retailers can count upon heavier prospect traffic for the eight weeks of May 1 through June 26.

The dealer-salesmen are rung in on the contest on two scores.

From May 1 to August 1 sales of electric ranges, water heaters, driers or air conditioners sold to PGE customers because of the wiring plan will earn point credits for them. Sales not tied to the wiring plan will earn points if by reason of a sale a PGE customer qualifies for PGE's all-electric rate because of purchase of a range or water heater or both. Points will apply to premiums but each verified sale earns a chance in a drawing which will reward one of the 600 with either an all-expense-paid two-week vacation for two in Hawaii or a 14-ft utility boat, outboard motor and transport trailer.

Lamp Efficiency Raised

A 42% increase in light output of General Electric's 400-watt color-improved reflector mercury lamp was recently announced by the company's lamp division. The improvement steps up the lamp's light output from 12,300 lumens to 17,500 lumens.

This substantial increase in light output has been made possible, according to G. E., by utilizing the fluorescent phosphor on the lamp's inner surface as the reflector and by eliminating the metallic coating. Visible red radiation, emanating from both sides of the phosphor particles, is said to be the chief factor in improving the color quality of light from the new lamp.

To Promote Freezers

Some 2,500 home freezer dealers are now participating in a mass merchandising program under the sponsorship of McCall's Magazine. Planned to tie-in with national promotion of home freezers by the Edison Electric Institute and the 25th anniversary celebration of the discovery of frozen foods by Clarence Birdseye, McCall's program is based on an 8-page home freezer-frozen food feature from the May issue of the magazine.

According to McCall's, retailers in 17 key market areas have been selected to participate. In addition, McCall's plans a special home service program for use by utilities.

Range Push in Chicago

"Operation Five-Spot", a $10,000 electric range dealer sales contest, sponsored by the Electric Cooking Institute of the Chicago Electric Association, began Feb 8. Each dealer entering the competition is assigned a quota based on his range sales in 1953. For each range sold by him above his quota and installed before the end of the campaign, May 8, he gets a five-spot—a $5 bill.

An additional incentive is $3,000 in special prizes. Dealers are grouped into four squadrons according to their assigned sales quotas. Thus in competing for the special prizes—$400 first, $250 second, $100 third—no dealer will strive against others very much larger or smaller than he is.

SINGLE OVERHEAD LIGHTING unit with four sections of fluorescent tubes makes satisfied customers for knitting yarn and accessory store displaying 350 different color blends.

Yarn Shop Color Problems Solved

NORMAN E. TICEHURST
Cambridge (Mass.) Electric Light Co.

When customers get home with, and have another look at, yarn bought at the store of Art Craft Industries in Cambridge, Mass, they don't discover that it isn't really the color they want. At least no yarn has been returned for that reason since the store moved into new quarters where modern lighting was installed. Now the customer sees the same color of yarn at home as she did in the store when she bought it.

Called upon for advice, the illuminating service division of the Cambridge Electric Light Co brought in a color comparator to show how the merchandise would look under cool white, warm white, de-luxe cool, and de-luxe warm fluorescent tubes. After careful inspection, the store owners concluded that the de-luxe cool white gave the best appearance to the stock over the greatest range of colors in the displays.

The store being long and narrow—40 ft by 14 ft—a centered line of four 8-ft fixtures was recommended. Each contains four T-12, 430 ma tubes. At table height under the fixtures the intensity is 80 ftc, tapering off to 50 along the front of the yarn bins at the walls.

Helping the industry meet its growing loads

Designing transformers to measure ever higher voltages

"Will it be possible to measure tomorrow's higher voltages on a practical basis?" As recently as one year ago, utility management did not have an answer to that question.

Today, it can be answered—in the affirmative—with assurance. The highest voltage potential transformer ever built—for 330 kv—is tangible evidence.

This tremendous unit would have been even larger—perhaps impractical without the sound basic design made possible by over twenty years of utility co-operation and continuing high-voltage research. This work has resulted in various important developments many of which have been Westinghouse "firsts" for the industry. To name just a few—

Oil-filling under vacuum was first introduced by Westinghouse to assure full impulse strength the moment the units are placed in service. This practice has been accepted as a standard of the industry.

Quality-control impulse testing was another Westinghouse innovation which has been highly successful in improving the reliability of instrument transformers in general.

Hipersil® for transformer cores, still a Westinghouse exclusive, is a highly permeable, grain-oriented silicon steel, which makes possible substantial reductions in transformer size and weight.

All of these research results, plus the vast storehouse of application knowledge accumulated by Westinghouse engineering over the years, have their place in the practical measuring of tomorrow's higher voltages. They are proof of the continuing objective at Westinghouse to provide utilities with equipment which will continue to aid them in successfully meeting their growing loads. J-97181

YOU CAN BE SURE... IF IT'S Westinghouse

Largest potential transformer built!

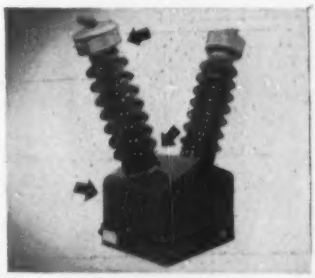
The Westinghouse Type VP potential transformer—the largest ever built—illustrated at left is for operation on a 330-kv, 3-phase, 60-cycle system. It is 26 feet high, weighs 41,000 pounds and covers a projected floor space of 92″ by 88″.

This tremendous unit would have been much larger physically without the basic design features proved in lower rated units and the continuous research into high-voltage applications. In addition, other basic design features include:

Interchangeable bushings

Condenser bushings on VP potential transformers (25 kv and higher) are interchangeable with those used on power transformers of the same voltage class. They give high mechanical strength—high puncture strength—with relatively small size and weight.

Hermetic sealing



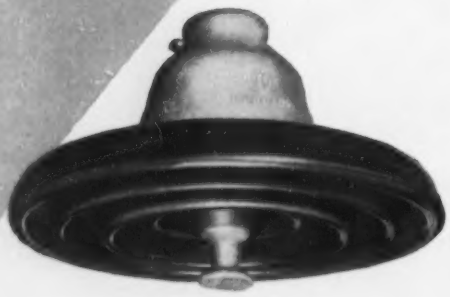
Porcelain weather housing of bushings is solder sealed at the cap and flange. High-voltage bushing flanges are welded to the tank. All tank seams are arc welded. The security of all joints of the complete vacuum filled assembly is then proved by an oil-pressure test.

This "hermetically-sealed" construction assures sustained transformer accuracy necessary to the reliable measurement of high voltage at any level.

For more information on the most complete line of instrument transformers on the market, call your nearby Westinghouse representative or write direct to Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

ON TEST MORE THAN 35 YEARS

Designs for this O-B Unit started back in 1915



This O-B Insulator, No. 32440, a 10-inch suspension in current production, embodies TIME-PROVED features in design and construction. Choose your insulators on the basis of known dependability. Choose O-B!

You get a product of PROVED dependability in every O-B suspension insulator. For example, these features were in use back in 1915:

1. Wet-process porcelain
2. A glaze in compression
3. Sanded surfaces between porcelain and cement for high-strength assemblies
4. Provision for thermal relief to accommodate expansion and contraction forces
5. Malleable iron cap castings
6. Application of galvanizing to withstand corrosion

All of the above have been subject to continuous refinement. Other features have been added. After a third of a century of experience, we feel we can lay claim to proficiency in insulator design *and* manufacture.

To you - the user - this experience and this proficiency mean only one thing:

Time-tested, trustworthy O-B insulators give you a bonus in quality - at a competitive price - unmatched in the insulator industry!

4437-H

Ohio Brass

MANSFIELD OHIO, U.S.A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

MANUFACTURERS AND MARKETS

345-Kv Towers . . .

for B. C. Electric line will be manufactured in Italy

Contract for construction of prefabricated steel transmission towers to carry British Columbia Electric Co's new 345-kv line was awarded to the Italian SAE Co. It competed with bids from all parts of the world. Value of contract is $760,000.

The transmission line is to be constructed from Pemberton Meadows, along Harrison Lake, B. C., to link with the recently completed Wahleah transmission line near Rosedale.

First shipment of the towers has already been unloaded at Vancouver. Built to BCE specifications, the units were taken shipped in knock-down condition, and will be assembled in the field. Engineers from Italy are expected to supervise the assembly.

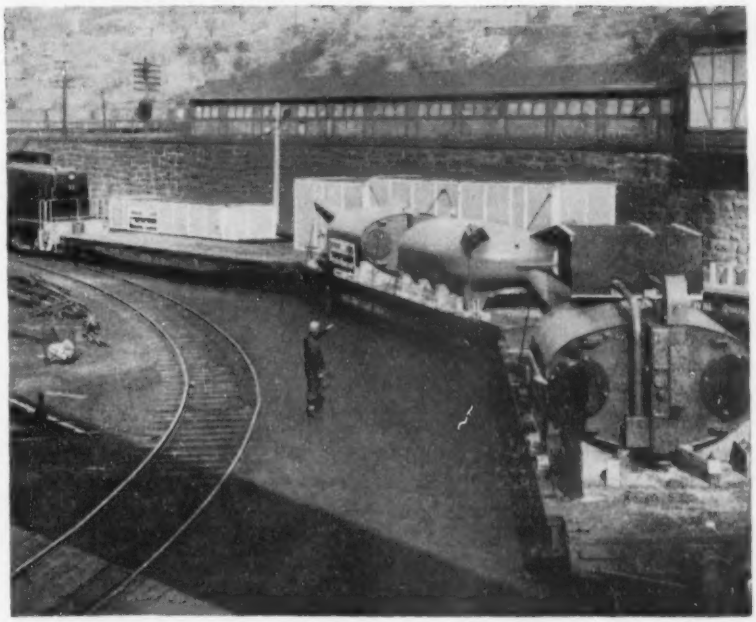
The New Harrison Lake power line will provide a second outlet from BCE's Bridge River hydro plant to serve the British Columbia mainland. It will also be an alternative power route in the event of a general emergency.

Aluminum Hits Peak

U. S. primary aluminum production in March was 244,678,349 lb, an all-time record month output, the Aluminum Association has announced. February's production was 220,965,786 lb and April's 240,862,931 lb. Total production for the first four months of 1954 was 939,000,273 lb compared with 778,150,308 lb for the same period in 1953. The report includes the entire output of 95 companies.

Tariffs on Electrical Units

CANBERRA — (Reuters) — New tariff duties on certain types of circuit breakers and switch units have been imposed by Australia. Duties on the specified electrical equipment range as follows: British preferential from free to 27½%; intermediate from 12½ to 45%; and general from 12½ to 55%.



Westinghouse Ships 330-Kv Breaker

First 25-million kva circuit breaker is shown (above) being loaded for shipment by Westinghouse Electric Corp from its East Pittsburgh Plant. The 330-kv unit, first of 35 similar units to be built by the company, is slated for the Atomic Energy Commission's new 330-kv system in the Portsmouth, Ohio, area. The breaker is expected to be ready for service this month.

Size of the giant three-pole breaker called for it to be disassembled for shipment on railroad flat cars. The three tank units and operating mechanism compartment are pictured (above) on two cars leaving the plant. Each tank unit, complete with porcelain condenser bushings, is 28 ft high, weighs 30 tons, and contains 3,500 gallons of oil.

MANUFACTURING BRIEFS

Leads & Northrup Co plans to construct a 250,000-sq ft instrument plant on a 129-acre tract adjacent to North Wales, Pa., about 22 miles from Philadelphia. Work on the $4-million project is set to start this fall with occupancy in late 1955. Approximately 1,300 of the firm's 3,100 employees will be at the new location.

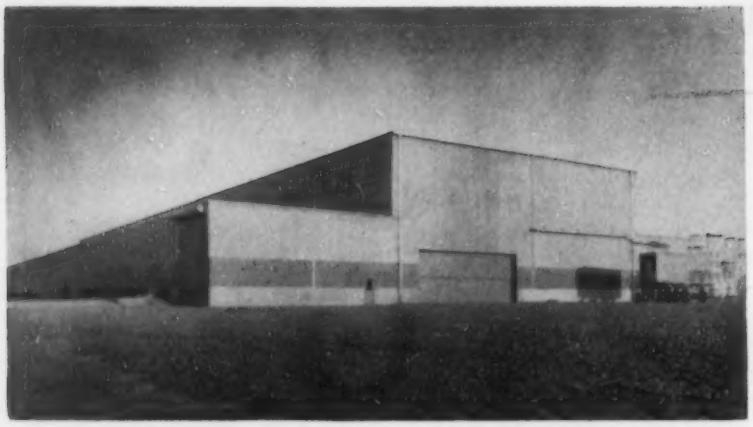
Building construction is completed and pilot operations are under way in a new plant of Goshen Rubber Co., Inc., Goshen, Ind., for fabricating precision-molded silicone parts.

Worthington Corp, Harrison, N. J., manufacturer of pumps and air-conditioning and refrigeration equipment, has moved its New York executive headquarters and district sales and export offices to 99 Park Ave.

A projected $1 million building program was begun at Lancaster, Pa., by the Permutit Co with the addition of a modern metalworking plant costing approximately $750,000 as a preliminary step. The company's executive offices are in New York.

A new home office and factory has been opened at Doylestown, Pa., by the Atlas Chain & Manufacturing Co, maker of precision-built roller chain. The new Doylestown headquarters augment the Northeast Philadelphia plant which will remain in operation.

Joseph T. Ryerson Son, Inc., Chicago steel warehousing organization, has broken ground in Detroit for a building to be occupied by its concrete



Transformer Factory in Operation

Central Transformer Corp has begun full production in its new factory at Pine Bluff, Ark. The ultra-modern plant has 80,000 sq ft of ground floor space and 5,000 sq ft of second floor space. It is equipped with two traveling cranes, one a 10-ton and the other 40-ton, and complete testing facilities including an impulse generator for impulse tests.

reinforcing steel division. The new unit is expected to be completed about the middle of the summer.

Oerlikon Machine Tool Works, Zurich, Switzerland, is studying the American market and seeking a licensed representative for a-c network analyzers in the United States. The company is now represented by Olkon Research Corp, New York and Washington, D. C.

A record $685,842 was awarded employees of the General Electric Co, Schenectady, N. Y., and its affiliates during 1953 for 29,939 useful suggestions adopted under GE's suggestion award program. The previous high was $578,947 in 1952 for 27,432 suggestions adopted. This year's top award of $4,800 went to John M. Erwin of the Large Motor and Generator Department for an idea for better utilization of copper in manufacturing products of his department. Second award of $4,100 went to Rufus D. Bradt of the Medium Induction Motor Department. Largest ratios, 2,505 suggestions, 810 acceptances per 1,000 employees, was in silicone products department.

General Mills, Inc., has announced its home appliance business in Minneapolis has been sold to the Illinois McGraw Electric Co, a wholly owned manufacturing subsidiary of McGraw Electric Co.

Norge (Australia) Pty, Ltd, has been established as a partnership of an Australian firm, President Consolidated, Ltd, and Borg-Warner Corp, Chicago, Ill., to manufacture in Australia a wide range of refrigerators, freezers, washing machines and cooking ranges.

MANUFACTURERS' EARNINGS

Company	Period Months Ended		Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Anaconda Wire & Cable	3	Mar.	$1,256,853	$1,921,922	$1.49	$2.28
Bowser	3	Mar.	6,207	123,173	0.03(a)	0.10
Chicago Pneumatic Tool	3	Mar.	1,473,554	1,247,011	2.96(b)	2.57(b)
Cornell Dubilier Electric	3	Mar.	847,953	895,204	1.59	1.68(c)
Ingersoll-Rand	3	Mar	5,983,334	4,842,789	2.96	2.39
Minnesota Mining & Mfg	3	Mar.	5,354,866	4,354,859	0.64(b)	0.53(b)
Motorola	3	Mar.	1,644,084	3,174,208	0.85	1.64
Radio Corp of America	3	Mar.	10,066,000	9,293,141	0.66	0.61
Sangamo Electric	3	Mar.	410,360	503,773	0.59	0.72

Note—(a) On preferred stock. (b) Based on number of shares outstanding at close of the period. (c) Based on number of shares now outstanding.

MEETINGS CALENDAR

Pennsylvania Electric Association
Electrical Equipment Committee, Lord Baltimore Hotel, Baltimore, Md., May 24-25.

American Institute of Electrical Engineers
Conference on Telemetering, Morrison Hotel, Chicago, May 24-26; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25; Committee on Petroleum, Conference on Electrical Applications in Petroleum Industry, Mayo Hotel, Tulsa, Okla., Sept. 27-29; Middle Eastern District Meeting, Abraham Lincoln Hotel, Reading, Pa., Oct. 5-7; Fall General Meeting, Morrison Hotel, Chicago, Oct. 11-15.

1954 National Telemetering Conference
Sponsored jointly by Institute of Radio Engineers, American Institute of Electrical Engineers, Instrument Society of America, and Institute of Aeronautical Sciences, Hotel Morrison, Chicago, May 24-26.

***Edison Electric Institute**
22nd Annual Convention, Atlantic City, N. J., June 1-4; Accident Prevention Committee, Mark Hopkins Hotel, San Francisco, July 1-3; Industrial Relations Committee, Round-Table, Conference, Palmer House, Chicago, Sept. 27-29.

National Association of Electrical Distributors
Annual Convention, Atlantic City, N. J., June 6-11; Pacific Zone Convention, Mark Hopkins Hotel, San Francisco, Oct. 4-7.

American Society of Engineering Education
62nd Annual Meeting, University of Illinois, Urbana, Ill., June 14-18.

Illuminating Engineering Society
Midwestern Regional Meeting, Hotel Jefferson, St. Louis, June 17-19; National Technical Conference, Chalfonte-Haddon Hall, Atlantic City, N. J., Sept. 12-16.

American Society of Mechanical Engineers
Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24; Fall Meeting, Schroeder Hotel, Milwaukee, Wis., Sept. 8-10.

Nuclear Engineering Conference
Sponsored by American Institute of Chemical Engineers, University of Michigan, Ann Arbor, Mich., June 20-26.

Canadian Electrical Association
Annual Convention, Murray Bay, Quebec, June 24-26.

Michigan Electrical Association
Annual Convention, Grand Hotel, Mackinac Island, Mich., June 27-30.

Northwest Electric Light & Power Association
Personnel Section with EEI Industrial Relations Committee, Multonah Hotel, Portland, Ore., July 12-14.

World Power Conference
Sectional Meeting, Rio de Janeiro, Brazil, July 25-Aug. 10.

Pan-American Federation of Engineering Societies
(UPADI), Third Convention, Sao Paulo, Brazil, Aug. 2-12.

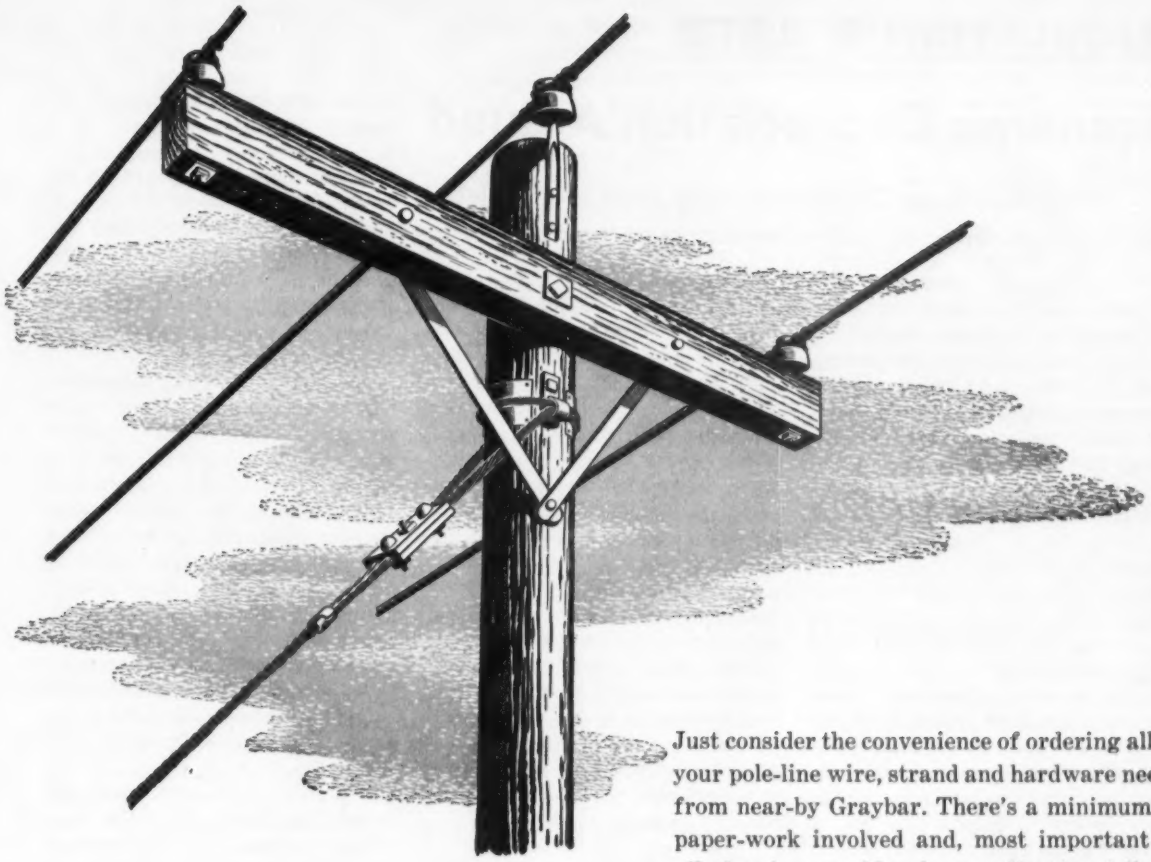
***Public Utilities Association of Virginias**
36th Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 16-18.

Indiana Electric Association
Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 6-8.

Interstate Power Club
Meetings will be held at Hotel Martinque, New York, on following dates: Oct. 11, Dec. 6.

***Public Information Program**
Workshop Conference, Chase Park Plaza Hotel, St. Louis, Missouri, Oct. 28-29.

* Addition this week.



Just consider the convenience of ordering all of your pole-line wire, strand and hardware needs from near-by Graybar. There's a minimum of paper-work involved and, most important of all, there's no problem in co-ordinating deliveries from numerous widely-separated suppliers.

LINE WIRE
STRAND
HARDWARE

Graybar thoroughly understands the needs of the nation's power companies . . . can furnish supplies and materials "from the bottom of the hole to the top of the pole." Graybar Outside Construction Specialists are always ready to help you plan or carry out any project.

Taken all together, you can see why it pays to call Graybar first for everything electrical . . . routine or emergency. *Graybar Electric Company, Inc. Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.*

311-95

...all via GraybaR

Call Graybar first for...

GraybaR Everything Electrical GraybaR ELECTRIC COMPANY

IN OVER 100 PRINCIPAL CITIES

Economic Depreciation Argued

Illinois Commerce Commission ruling paves way for introduction of evidence on such allowance in rate-making setup

While several attempts were made to introduce economic depreciation into the rate-making process in Missouri and Illinois by affiliates of the American Telephone & Telegraph Co, no judicial notice or recognition was given to it.

Peoples Gas Light Case . . . However on May 28, 1953, in the case of Peoples Gas Light & Coke Co, the Illinois Commerce Commission order said in part: "The commission, having considered the evidence and arguments of counsel for the company and the city with respect to the annual provision for depreciation, is of the opinion that the claim of the company for allowance of economic depreciation is one for straight line, age-life depreciation on original cost plus a claim for the equity owners' portion of the excess over that amount of a straight line, age-life requirement at reproduction cost computed by using multipliers based on purchasing power of the dollar index numbers instead of construction cost index numbers or unit costs of reproduction. The company, in its argument, repudiates the apparently expected charge that this claim is one for depreciation on reproduction cost. It is clear that depreciation on reproduction cost is not allowable."

However, the commission allowed the company substantial increases in the annual rate for depreciation because of the changed circumstances of the company's operation, especially because of the increased use of natural gas.

Iowa-Illinois G&E Case . . . In another important ruling, on Sept. 28, 1953, in the case of the Iowa-Illinois Gas & Electric Co, the ICC stated that with regard to economic depreciation which the company claimed that "in arriving at just and reasonable rates its depreciation expense should be computed on reproduction cost at Jan. 1, 1950, price levels on inventory of June 30, 1953."

"The commission pointed out in its order in the **Peoples Gas** case, that annual depreciation based on reproduction cost cannot be allowed. Another reason for rejecting the company's contention in this respect is that the company now has pending before this commission a petition to change the method of computing depreciation expense . . . and until that matter has been finally concluded, the present Uniform System of Accounts stands as controlling for Illinois gas and electric utilities unless some specially cogent reason for change in a particular situation appears. The record herein is devoid of such reason and on the contrary indicates that the company has been able to meet its replacement requirements out of currently available funds."

Commonwealth Ed Case . . . Again in its ruling on the Commonwealth Edison Co case, on Jan. 16, 1954, the ICC stated in its order that "the company asserts that its annual allowance for depreciation in fact understates the value of the plant worn out in service during the accounting year. This claim rests upon the fact that, under prevailing price levels, replacement facilities cost considerably more than—as much as double—the original cost of facilities retired."

The company's witness contended that only by this means ". . . can the actual value of the property used up in rendering public utility service be returned to the investor. This theory of economic depreciation is of rather recent origin, has been widely discussed, and has been accepted in only isolated instances. It has not, as yet, been adopted by this commission. It presents significant and challenging implications which need not be explored in this proceeding in view of the fact that the company's test year statements do not claim economic depreciation, and in view of the further fact that the earnings yielded by the proposed increases, without the benefit of economic depreciation, are not beyond the fair rate of return provided by law."

Duquesne Light Case . . . In the case of the Duquesne Light Co case, on Dec. 22, 1953, the Pennsylvania Public Utilities Commission said, "Respondent submitted three witnesses contending that annual depreciation should be based on replacement cost and not on original cost of plant. To follow the claim of respondents through these witnesses would require respondent's customers to return to respondent not the cost of plant being utilized in providing service to them but the cost of the plant to replace the plant actually being used. To follow such a claim would require respondent's customers to provide a portion of the capital needed for the construction of the replacement. The very definition of annual depreciation is that it shall be based upon the cost of the plant being used in the public service and respondent's claim would violate this.

"We have consistently found that annual depreciation should be based only on original cost, which findings have been upheld by the Superior Court of Pennsylvania . . . The court further stated that to adopt the position of Duquesne 'would require the ratepayers to provide, in effect, in periods of rising prices, capital contributions and sustain alone the effects of inflation.' "

Southern Bell Case . . . Economic depreciation came closest to receiving judicial recognition in the case of a ruling by the Superior Court of Mecklenburg County, N. C., on an appeal by the Southern Bell Telephone & Telegraph Co from a ruling by the North Carolina Public Utilities Commission. The court said, "In view of the quoted findings of the commission, it appears that the commission did not allow as an expense of operation an amount estimated and determined by it to be a depreciation allowance reasonably sufficient to restore currently the portion of capital investment currently consumed. The court is of the opinion that the commission must do so."

However, the decision was in turn appealed to the North Carolina Supreme Court which, on Aug. 24, 1953, reversed the lower court and upheld

the PUC in disallowing any adjustment for economic depreciation. The court, in its ruling, said, "The court below directed the commission 'in its determination of net operating income to allow depreciation as an expense of operation in such amount as in its judgment will be reasonably sufficient to restore currently the portion of capital investment currently consumed.'

"It is apparent the parties construe this instruction to mean that the current rather than the cost value shall be the basis for estimating depreciation allowances. If this is the correct interpretation of the language used by the trial judge, the instruction must be held for error.

"For rate-making purposes a public utility is allowed to deduct annually as an operating expense so much of its capital investment as is actually consumed during the current years in rendering the service required of it. But the cost represents the amount of the investment, and it is the actual cost, not theretofore recouped by depreciation deductions, that must constitute the base for this allowance."

The court also said, "The whole purpose of the allowance is to maintain the integrity of the investment—to prevent a loss, not to assure a profit."

In a recent decision by the Alabama Public Service Commission, Southern Bell's claim to economic depreciation was disallowed.

At the present time both Michigan Bell Telephone Co and New York Telephone Co are before their respective commissions on rate increase proceedings in which testimony on economic depreciation has been presented.

PS Co of Colorado Asks PUC For a 12.96% Hike

Public Service Co of Colorado has asked the state Public Utilities Commission for a 12.96% increase in electric rates.

The requested boost would raise the company's electric revenues $3,879,000 annually, Vice Pres W. D. Virtue told the commission. He said gross electric revenues in 1953 totaled $29,929,000.

After company officials introduced evidence in support of their rate increase application, the hearings were recessed by the PUC until June 7.

Attorneys for the City of Denver and the Colorado Municipal League will cross-examine company witnesses when the hearings resume. The municipal league raised $40,000 to finance its opposition to the PSC request for a rate hike.

Malcolm Crawford, assistant city attorney for Denver, said he will raise an involved legal question when the cross-examination begins.

The question revolves around a 20-year franchise voted by Denver to the company in 1947. Crawford said the franchise provided there could be no electric rate boosts in Denver without action by the City Council unless prevailing rates are deemed "confiscatory."

However, last June Denver voters approved a charter amendment placing regulatory control of utilities with the PUC. Previously, the PUC had no control over Denver utilities because it was a so-called "home rule" city. Crawford said a court may have to determine if the franchise were voided by the 1953 vote or if the 1947 contract is still in effect.

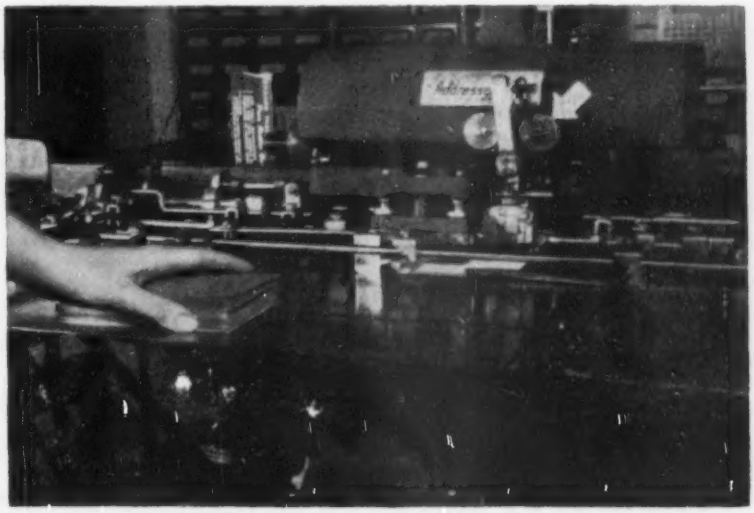
PS of Colorado's vice president told the commission that the company's return was 5.2% on a net electric department investment of $150,275,406. Virtue said the proposed rate increase would give the company a return of 6.75% on its present electric investment.

J. E. Loiseau, president of Public Service, told the commission his firm needed the rate raise—first in its history—in order to maintain the company's investment standard and to enable it to attract financing for a $69 million construction program in the next two years.

Loiseau said $54 million of the proposed construction expenditures must be obtained from investors. "If our company is to attract this new capital at reasonable costs," he said, "it must demonstrate its ability to earn a fair return."

PUD Rates Revised

Grays Harbor Public Utility District Commissioners at Aberdeen, Wash., have approved revision of residential rates from 1¼¢ a kwhr to ¾¢ a kwhr for customers using over 1,200 kwhr a month.



New Gadget Cuts Puget Sound P&L Work

Addition of the attachment indicated by arrow above makes it possible for the Puget Sound Power & Light Co of Seattle to run its postcard bills through the Addressograph only once, instead of the double run formerly required. The attachment, developed by J. H. Edwards, machine maintenance man for the general billing department, imprints the date and route number on the cashier stub at the same time the name and address are being imprinted on the other side. It is actuated by the mechanism of the Addressograph and includes an automatic ribbon reversing feature.

FINANCIAL

Accounting Plan

Pacific G&E gets PUC approval for fast amortization in its income account

Permission to use an accounting procedure that would eliminate fluctuations in its income account resulting from rapid amortization of emergency facilities has been granted Pacific Gas & Electric Co by the California Public Utilities Commission. This became effective May 17.

During the amortization period the utility wants to charge the tax reduction to its income account, transferring the amount to a newly created restricted surplus account.

The tax increase during the post-amortization period also would be compensated for. An amount equal to the yearly increase would be transferred from the restricted surplus account and credited to the income account.

Necessity Certificates . . . PG&E has certificates of necessity permitting rapid writeoff of $104,792,110 of expenditures for emergency facilities. Applications are pending for certificates for additional expenditures of $12,460,077.

Tax reductions of about $48,173,500 accruing over a 60-month period would be transferred to the new restricted surplus account. The utility says the new accounting procedure, which has been approved by the Federal Power Commission, would enable it to generate about $50 million from internal sources for construction purposes.

The utility has elected to start accelerated amortization of each new facility the year after its completion.

FINANCIAL BRIEFS

Hartford Electric Co employees have been offered 5,450 common shares at $45 a share. Offer expired May 21 . . . **A syndicate** headed by McLeod, Young, Weir & Co has sold $15 million 3% debentures due 1964 at 98 to yield 3.23% and $35 million 3½% debentures due 1979 at 100 of Hydro-Electric Power Commission of Ontario.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1954									
May 13	**2.85**	**2.91**	**3.14**	**4.02**	**4.14**	**4.45**	**4.75**	**5.19**	**5.48**
May 6	2.86	2.92	3.14	4.02	4.14	4.45	4.77	5.20	5.46
END OF QTR									
1st 1954	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10

Date: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Arkansas-Missouri Power	12	Mar.	$832,412	$874,544	$	$ ....
California-Pacific Utilities	12	Mar.	605,825	544,659	2.10(a)	2.04(a)
Central Illinois Electric & Gas	12	Mar.	1,839,273	1,934,070	1.99	2.13
Central Illinois Public Service	12	Mar.	5,973,812	5,565,540	1.48(b)	1.56(b)
Community Public Service	12	Mar.	1,277,873	1,223,493	....	....
Delaware Power & Light	12	Mar.	4,309,809	3,790,200	1.90(c)	1.85(c)
Idaho Power	12	Mar.	4,512,803	3,935,692	3.36	2.86
Iowa-Illinois Gas & Electric	12	Mar.	4,480,660	4,565,195	2.20	2.38
Kentucky Utilities & subsidiaries	12	Mar.	5,164,121	4,508,443	....	....
Lake Superior District Power	12	Mar.	1,016,953	954,881	....	....
New Jersey Power & Light	12	Mar.	1,531,511	1,285,171	....	....
Northwestern Public Service	12	Mar.	843,520	937,669	....	....
Pennsylvania Water & Power	3	Mar.	317,025	319,327	.54	.55
Public Service Co of Colorado	12	Mar.	7,913,343	7,408,124	2.33(f)	2.27(f)
Western Light & Telephone	12	Mar.	1,222,399	1,037,827	2.40(g)	2.14(g)
West Penn Electric, consolidated	12	Mar.	14,663,222	13,645,016	3.47	3.23
Wisconsin Public Service	12	Mar.	4,330,000	3,875,000	1.59	1.54

Notes—(a) Based on 229,780 in 1954 and 226,614 shares in 1953; (b) Based upon shares outstanding at the end of each respective period; (c) Based on 1,858,343 shares in 1954 and 1,627,640 shares in 1953; (f) Based on 2,754,639 shares in 1954 and 2,751,128 shares in 1953; and (g) Based on 391,857 shares in 195 and 391,009 shares in 1953.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF MAY 13-20			
Bonds			
Virginia Electric & Power—1st mtg 3⅛% due 1984	$25,000	102.4612%	3.00%
Pacific Gas & Electric—1st mtg 3⅛% due 1984	65,000	100.875	3.08
New York State Electric & Gas—1st mtg 3¼% due 1984	20,000	102.42	3.125
Preferred Stock			
Missouri Public Service—50,000 sh $100 par	$5,000	(Indefinitely postponed) (b)	
Public Service Electric & Gas—249,942 sh 4⅛% $100 par	24,994	$101.95	4.10%
South Carolina Electric & Gas—80,000 sh 4.50% $50 par cum.	4,000	50.00	4.50
Common Stock			
General Public Utilities—606,423 sh (being offered common-holders on a 1-for-15 basis, May 12 to expire June 2)	$17,283	$28.50	5.96%
SCHEDULE FOR MAY-JUNE-JULY			**Bid Date**
Bonds			
California Electric Power—1st mtg due 1984	$8,000	.....	May 25
Public Service Electric & Gas—1st mtg due 1984	50,000	.....	May 26
Consumers Power—1st mtg due 1984	25,000	.....	June 2
Southwestern Gas & Electric—1st mtg due 1984	10,000	.....	June 8
Gulf States Utilities—1st mtg due 1984	24,000	.....	June 15
Jersey Central Power & Light—1st mtg due 1984	6,000	.....	June 15
Central Illinois Public Service—1st mtg due 1984	5,000	.....	June 15
Gulf Power—1st mtg due 1984	10,000	.....	June 22
Duquesne Light—1st mtg due 1984	15,000*	.....	June 29
Consolidated Edison Co of N. Y.—1st mtg due 1984	50,000	.....	.....
Boston Edison—1st mtg	15,000	.....	.....
Preferred Stock			
Florida Power Corp—75,000 $100 par cum.	$7,500	.....	May 26(a)
Gulf States Utilities—160,000 sh $100 par	16,000	.....	June 7
Duquesne Light	5,000*	.....	June 22
Public Service Co of New Hampshire—about 75,000 sh.	7,500	.....	.....
California Electric Power—105,000 sh $50 par	5,250	.....	.....(c)
Connecticut Light & Power—200,000 sh.	.....	.....	.....
Common Stock			
Philadelphia Electric—900,000 shs (to be offered common-holders on 1-for-12 basis, record June 7, to expire June 28)	.....	.....	.....
Connecticut Light & Power—590,290 sh (to be offered common-holders on a 1-for-10 basis)	.....	.....	.....

Notes—*Estimated; (a) Kidder, Peabody & Co. and Merrill Lynch, Pierce, Fenner & Beane group underwriters; (b) Kidder, Peabody & Co group underwriters; and (c) Deferred; Merrill Lynch, Pierce Fenner & Beane, group underwriters.

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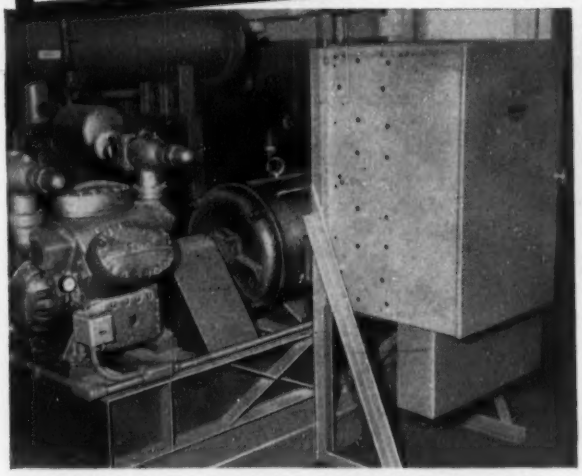
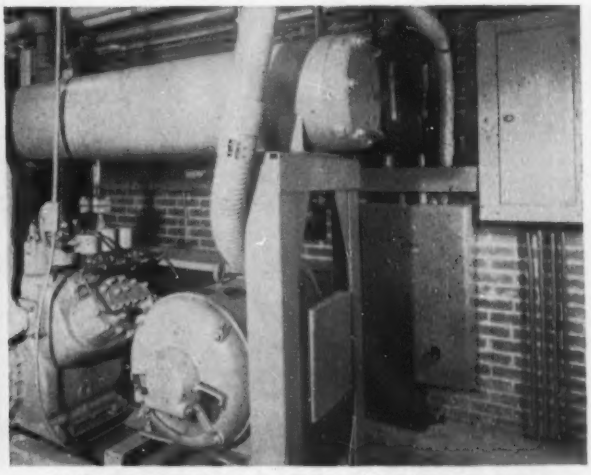


This 100 hp 3 step increment start motor, with double extended shaft, drives two refrigeration compressors in an Atlanta hospital.



A 40 hp open type high torque motor with an increment starter, drives this compressor in a Houston office building.

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You benefit when you install a Wagner Increment Motor and Starter "package" because you get a most economical, highly efficient motor and starter combination that limits inrush of motor current to values that are acceptable for the distribution systems of most power companies.

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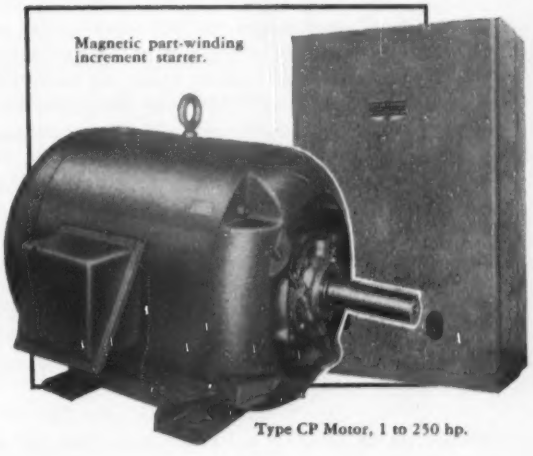

Magnetic part-winding increment starter.

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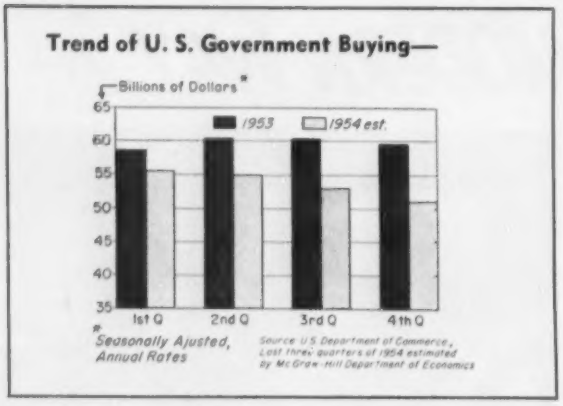
ELECTRICAL BUSINESS OUTLOOK



Government Still Affects Business

The importance of government in the business situation has rarely been clearer in peacetime than it is today, even though the present Administration would like very much to keep government out of business.

The federal government played a key role in causing the recent super-boom in business to get under way—and it's played a key role in bringing the boom to an end.

Defense Program Changes . . . Changes in the defense program, of course, are behind both of these developments. "National security" purchases of goods and services almost tripled between 1950 and 1953. That change was the single most important factor in the general boom in business. The government also encouraged business to invest heavily in new defense production facilities, further feeding the boom.

Now government spending is going in the other direction. Defense spending has dropped by more than $6 billion a year (annual rate) since the peak in the second quarter of 1953. And, according to the intentions voiced in Washington, it's going to continue to decline right through the entire year of 1954.

Lower defense spending has meant more than just a drop in direct business sales to the government. It's also played an important part in causing the recent big decline in business inventories. When military orders were canceled and new orders fell off, suppliers cut their stocks.

The drop in defense spending, plus the associated drop in inventories (EBO, May 10), accounts for nearly all of the decline in business activity so far. There are a good many people who think that this decline in business will continue until military spending is no longer being cut.

When will defense spending level off? That's obviously a key question in the business outlook. One clue lies in the rate at which new contracts for military deliveries are being let. Defense expenditures are now running at about $47 billion a year—but *new* defense business, as indicated by new orders, is only about $35 billion a year. That's just about a maintenance level of defense spending.

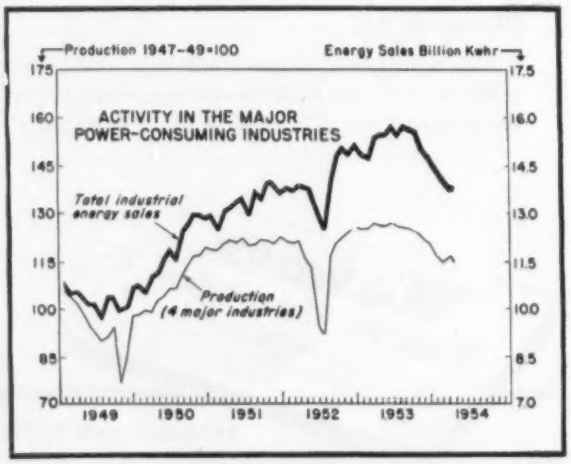
It would take about two more years, at the present rate, to get defense spending down to the $35 billion level indicated by new orders. So that's one gauge of how long defense policy may continue to be a drag on the general business situation.

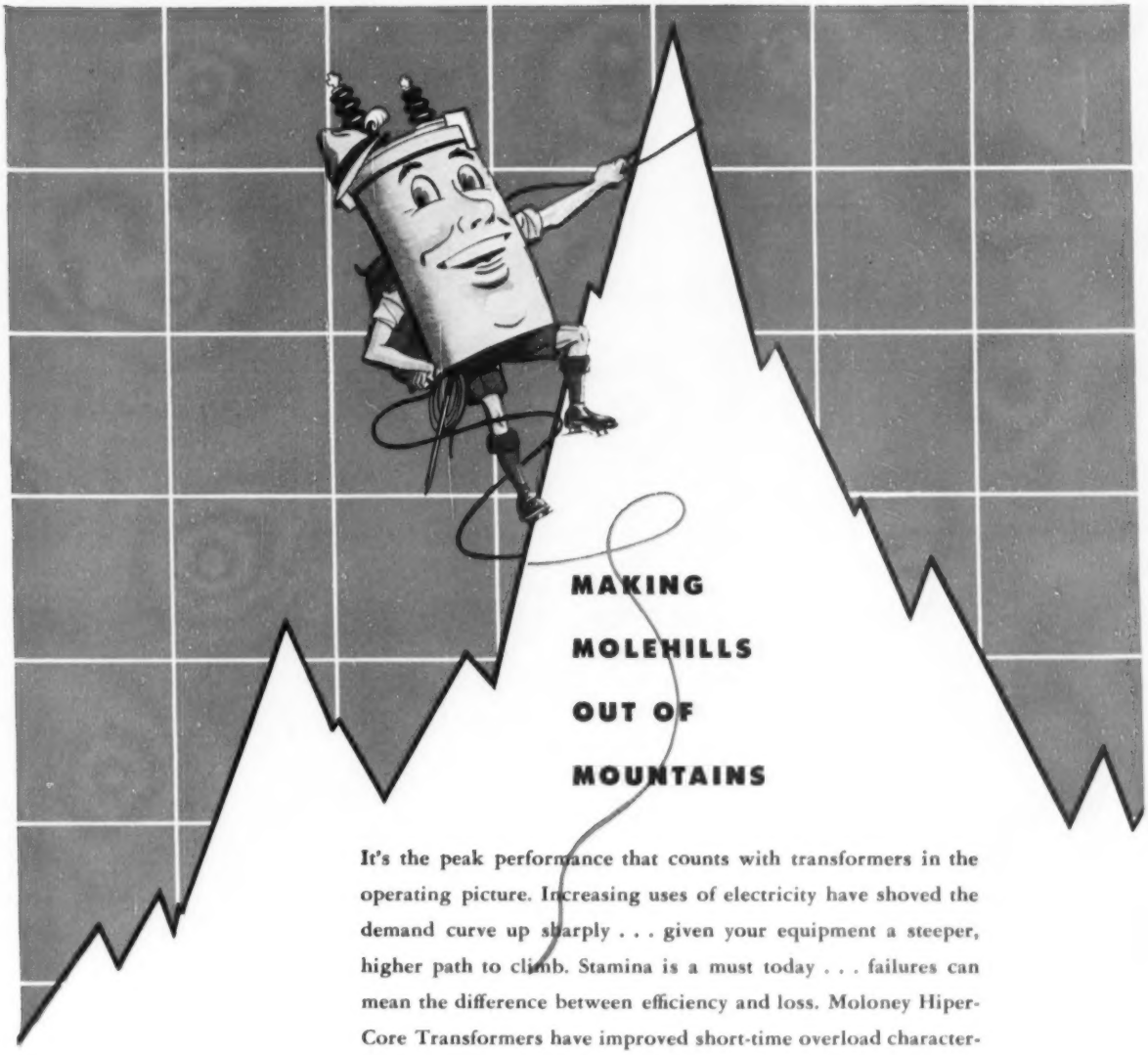
Drastic Changes in Outlook . . . However, this outlook is clearly open to drastic changes. An obvious reason for change would be further involvement in Indo-China, or in any other war. And it's always possible there will be a "new, new look" at defense policy as time passes, even if there is no new war.

Spending isn't the only influence that the federal government still has on business activity. Tax changes are important—and recent tax changes have been favorable to a higher level of business activity, notably through elimination of the excess profits tax. The chances are good there will be another tax cut for business next year.

Monetary policy has also been a key influence in the past year. A little more than a year ago, the Treasury and the Federal Reserve Board were trying to make borrowing tougher and more expensive. Since then, they have been doing just the opposite. And both policies have vitally affected the general business situation. Other policies, as on electric power, are still vital factors in some fields of business.

Finally, the government still influences business simply by talk. Statements by the President or the Secretary of State or other officials are important factors in creating a national attitude of pessimism or optimism.





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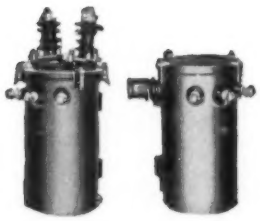

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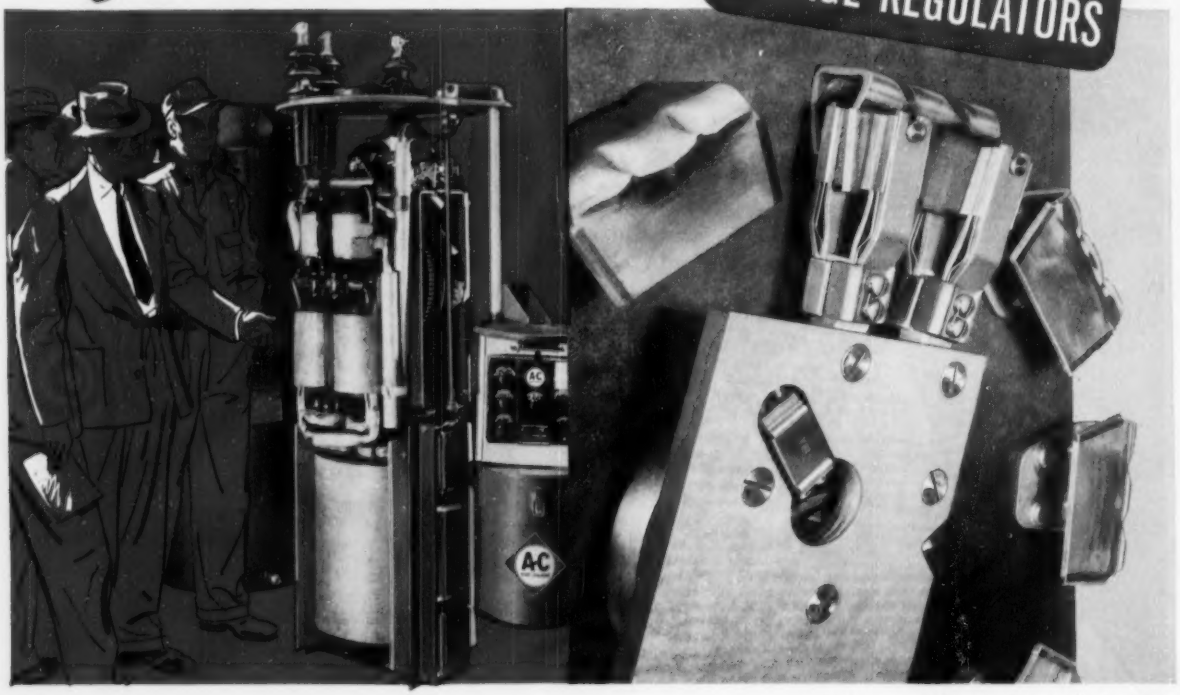

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